ORDER NO. VSD9912M914
D20/D25

Service Manual

DVCPRO MECHANISM

Sec. 1 Maintenance
Sec. 2 Mechanical Adjustment
Sec. 3 Major Mechanism Parts Replacement and Adjustment Procedures

This material is mentioned about procedures of Mechanical Adjustment and Replacement for DVCPRO product. Please refer to below indicated table, which models apply to this material.

TYPE	Category	Models
A	25M Studio VTR	AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D750, AJ-D850
B	25M Camera Recorder	AJ-D200, AJ-D210, AJ-D215, AJ-D400, AJ-D610, AJ-D700, AJ-D700A, AJ-D800, AJ-D800A, AJ-D810, AJ-D810A
C	25M Lap-top & Portable	AJ-D220, AJ-D230, AJ-D230H, AJ-D250, AJ-LT75, AJ-LT85
D	25M 4X Transmitter	AJ-DE77, AJ-D780
E	50M Studio VTR	AJ-D940, AJ-D950, AJ-D950A
F	50M Camera Recorder	AJ-D90, AJ-D900W, AJ-D900WA, AJ-D910WA, AJ-PD900W, AJ-PD900WA
G	50M Portable	AJ-D92, AJ-D94, AJ-D95DC

2nd Issue

Panasonic®

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

CONTENTS

SECTION 1

MAINTENANCE

CONTENTS

1. Maintenance Parts Schedule Charts

1-1. Type of VTR (except Camera Recorder)

	Name	Apply	Hours of Use (unit hours)					
			2,000H	4,000H	6,000H	8,000H	10,000H	12,000H
	Tape Path Cleaning	25M, 50M	"**C**" Clean the Tape Path at each 500 hours					
1	Cylinder Ass'y	25M, 50M	**R**	**R**	**R**	**R**	**R**	**IM**
2	Pinch Arm Unit	25M, 50M	**R, G**	**R, G**	**R, G**	**R, G**	**R, G**	**IM**
3	Cleaning Arm Unit	25M, 50M	**R**	**R**	**R**	**R**	**R**	**IM**
4	S,T Reel Rotor Unit	25M, 50M		**R (50M)**	**R (25M)**	**R (50M)**	**R (25M)**	**IM**
5	Thrust Screw Unit	25M, 50M		**R, L (50M)**	**R, L**	**R, L (50M)**	**R, L (25M)**	**IM**
6	S1 Loading Arm Unit	50M			**R**			**IM**
7	T1 Boat Unit	50M			**R**			**IM**
8	S5 Post Base A Unit	50M			**R**			**IM**
9	Tension Arm Unit	50M			**R**			**IM**
10	Mechanism Unit	25M, 50M						**R**
11	Front Loading Unit	25M, 50M						**R**
12	Fan Motor	25M, 50M	Replace the Fan Motor at each 10,000 hours ***Operation Hours***					

The following parts are included in the mechanism chassis. Therefore usual replacement is not necessary if the mechanism unit is replaced.

	Name	Hours of Use (unit hours)
		12,000H
13	A/C Head	**IM**
14	Loading Motor (1) AU	**IM**
15	Reel Drive Motor Unit	**IM**
16	Mode Switch Unit	**IM**
17	Pinch Solenoid	**IM**
18	S,T Brake Solenoid	**IM**
19	Distinction SW Unit	**IM**
20	Cleaner Solenoid	**IM**
21	Main Cam Gear	**IM**
22	Front Loading Motor	**F**

<Note>
Hours of Use are based on the head rotation hours.

Hours of Use are recommendation. It may depend on temperature, humidity or dust.

Hours of Use are listed as the reference of maintenance. They do not mean guaranteed hours.

"**R**" : These parts are replacement parts.
"**IM**" : These parts are included in Mech. Chassis Unit. Replacing Mech. Chassis Unit is recommended.
"**F**" : These parts are included in Mech. Chassis.
"**G**" : Wipe the old grease and apply new grease. (Use Molytone Grease)
"**L**" : The lubrication is necessary.
"**C**" : This mark means cleaning is necessary.

1-2. Type of Camera Recorder

	Name	Apply	Hours of Use (unit hours)					
			2,000H	4,000H	6,000H	8,000H	10,000H	12,000H
	Tape Path Cleaning	25M, 50M	"**C**" Clean the Tape Path at each 500 hours					
1	Cylinder Assy'y	25M, 50M		**R**	**R**	**R**	**R**	**IM**
2	Pinch Arm Unit	25M, 50M	**R, G**	**R, G**	**R, G**	**R, G**	**R, G**	**IM**
3	Cleaning Arm Unit	25M, 50M	**R**	**R**	**R**	**R**	**R**	**IM**
4	S,T Reel Motor Unit	25M, 50M		**R (50M)**	**R (25M)**	**R (50M)**	**R (25M)**	**IM**
5	Thrust Screw Unit	25M, 50M		**R, L (50M)**	**R, L**	**R, L (50M)**	**R, L (25M)**	**IM**
6	S1 Loading Arm Unit	50M			**R**			**IM**
7	T1 Boat Unit	50M			**R**			**IM**
8	S5 Post Base A Unit	50M			**R**			**IM**
9	Tension Arm Unit	50M			**R**			**IM**
10	M cassette Brake (S,T) AU	25M, 50M			**R**			**IM**
11	Mechanism Unit	25M, 50M						**IM**

The following parts are included in the mechanism chassis. Therefore usual replacement is not necessary if the mechanism unit is replaced.

	Name	Hours of Use (unit hours)
		12,000H
12	A/C Head	**IM**
13	Loading Motor (1) AU	**IM**
14	Mode Switch Unit	**IM**
15	Pinch Solenoid	**IM**
16	S,T Brake Solenoid	**IM**
17	Cleaner Solenoid	**IM**
18	Main Cam Gear	**IM**

<Note>
Hours of Use are based on the head rotation hours.

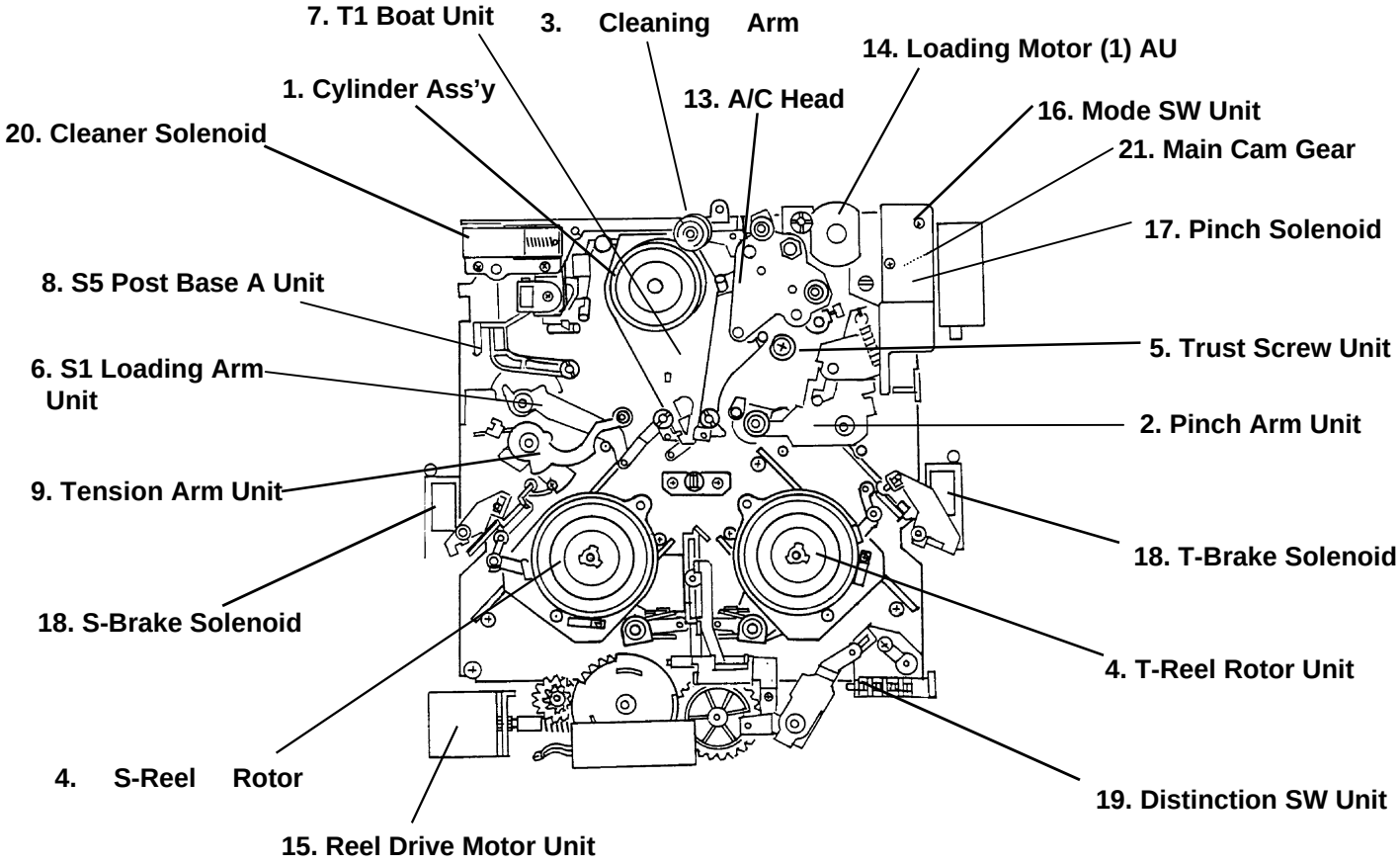
Hours of Use are recommendation. It may depend on temperature, humidity or dust.

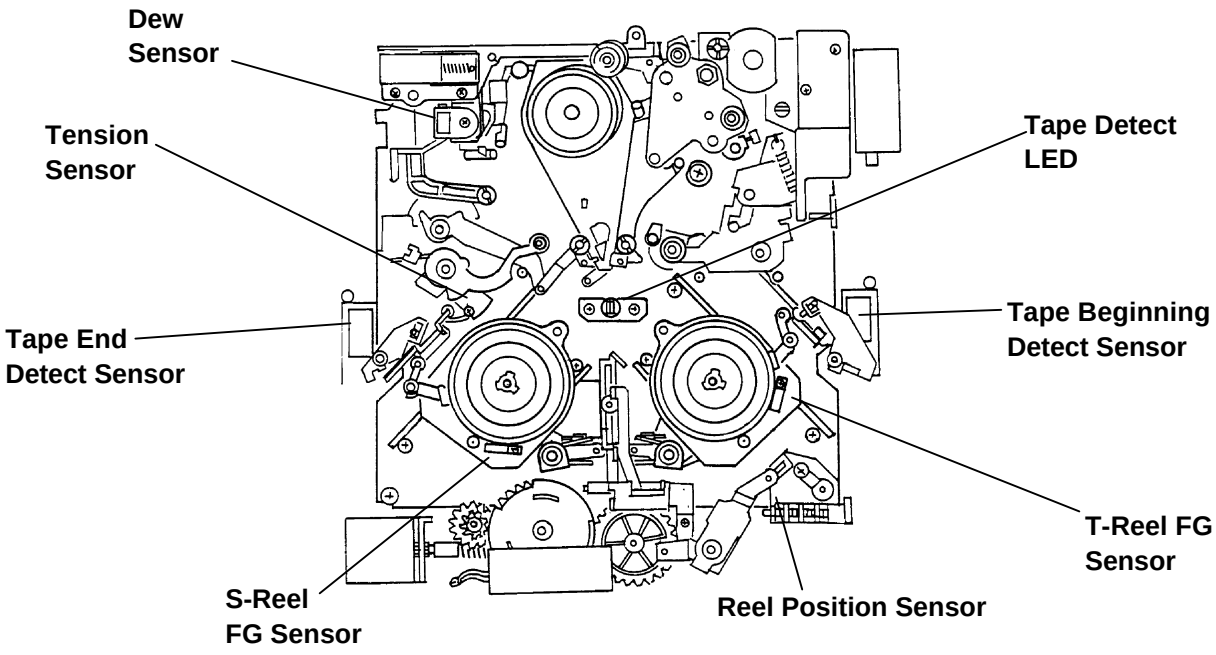
Hours of Use are listed as the reference of maintenance. They do not mean guaranteed hours.

"**R**" : These parts are replacement parts.
"**IM**" : These parts are included in Mechanism Unit. Replacing Mech. Chassis Unit is recommended.
"**F**" : These parts are included in Mechanism Unit.
"**G**" : Wipe the old grease and apply new grease. (Use Molytone Grease)
"**L**" : The lubrication is necessary.
"**C**" : This mark means cleaning is necessary.

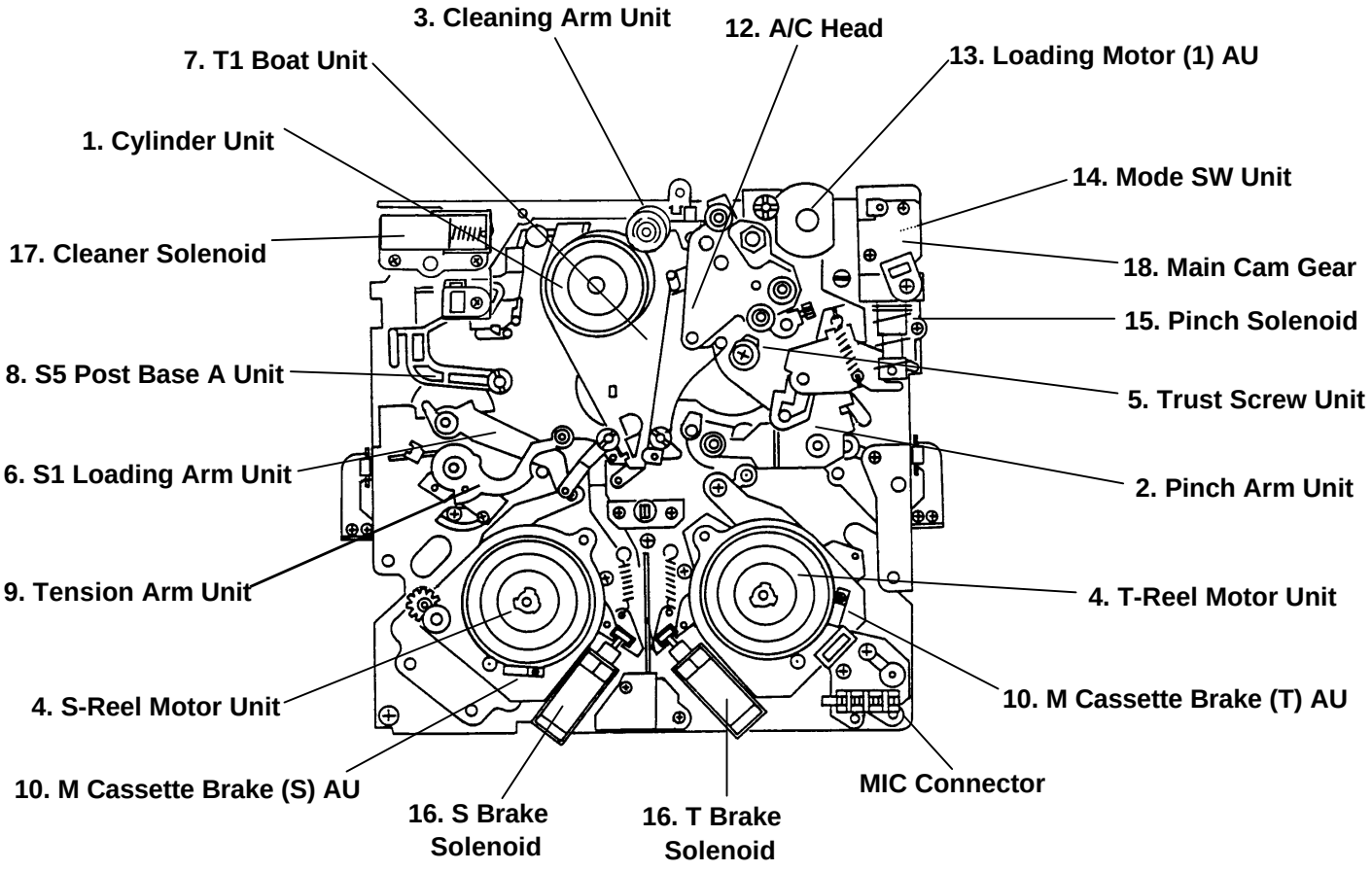
2. Parts and Sensor Location

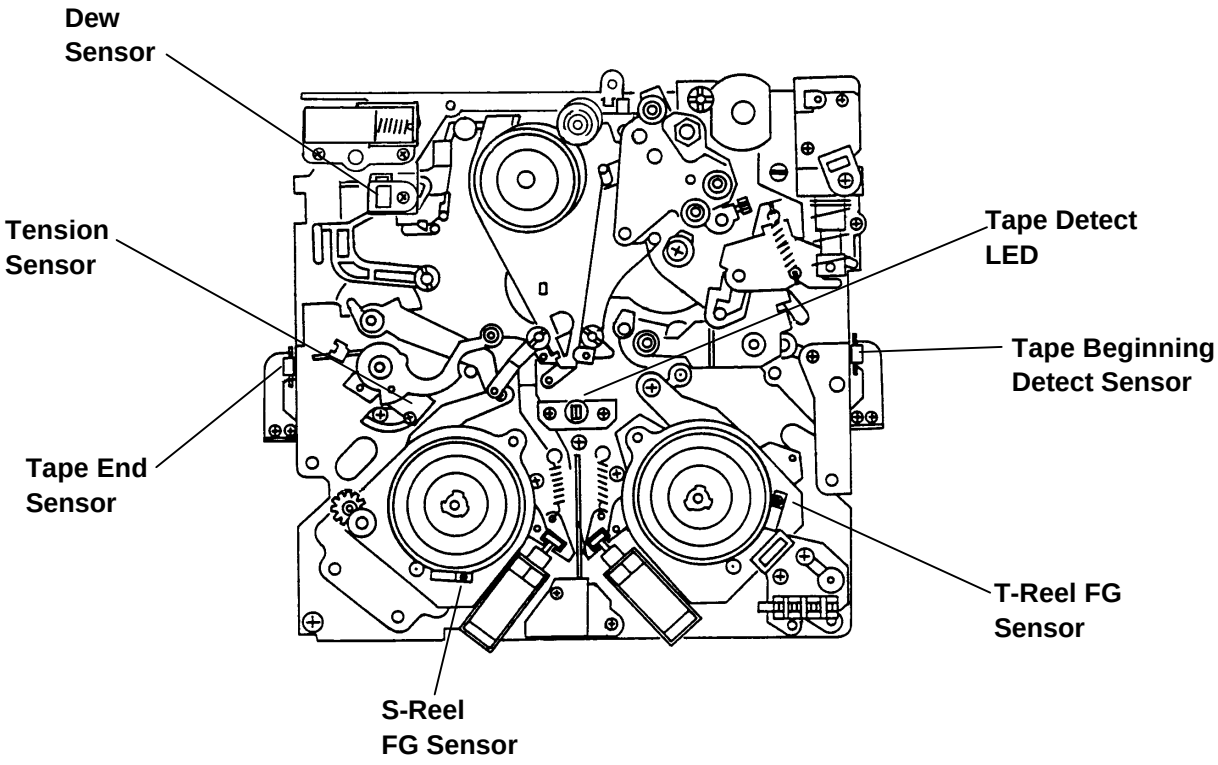
2-1. Type of VTR (except Camera Recorder)





2-2. Type of Camera Recorder



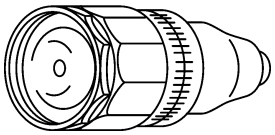


3. DVCPRO Test Fixture & Tool Kit List

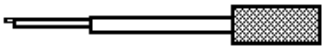
No	P/N(NTSC)	P/N(PAL)	JIG & EQUIPMENT	AJ-D750	AJ-D700	AJ-D650	AJ-D640	AJ-	AJ-D220	AJ-D200	AJ-LT75	AJ-	AJ-	AJ-	AJ-D950	AJ-D780	AJ-LT85	AJ-DE77	AJ-D210	PURPOSE
	General Jigs																			
1	VFK71A	---->	Dial Torque Gauge 1.5cN-m (1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Reel Break Force Confirmation
2	VFK0357	---->	Eccentric Screwdriver (1.5)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Mechanical Adjustment
3	VFK1145	---->	Back Tension Meter (T2-M30-F	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Tape Tension Adjustment
4	VFK1146	---->	Philips Driver	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	General
5	VFK1147	---->	Philips Driver	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	General
6	VFK1148	---->	Hex Driver (1.5)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Mechanical Adjustment
7	VFK1149	---->	Post Driver	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Tape Post height Adjustment
8	VFK1150	---->	Nut Driver (5.5mm)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Mechanical Adjustment
9	VFK1151	---->	Nut Driver (2.5mm)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Mechanical Adjustment
10	VFK1178	---->	Hex Driver (0.89)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Mechanical Adjustment
11	VFK1179	---->	Hex Driver (0.71)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Mechanical Adjustment
12	VFK1188A	---->	Dial Tension Gauge 30mN (300	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Tape Tension Adjustment
13	VFK1190	---->	HEX. Wrench	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Mechanical Adjustment
14	VFK1191A	---->	Dial Torque Gauge 0.45cN-m (	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Reel Torque Adjustment
15	VFK1209A	---->	Torque Driver 4-30cN-m (0.4-3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	A/C Head Adjustment
16	VFK1341	---->	CC Filter (3600K)							Y										Camera Adjustment
17	VFK1342	---------	CC Filter (4500K)							Y										Camera Adjustment
18	----------	VFK1343	CC Filter (3600K)							Y										Camera Adjustment
19	VFK1345	---->	CC Filter Holder							Y										Camera Adjustment
20	VFK1346	---->	CC Filter Step Down Ring							Y										Camera Adjustment
21	VFK1347	---->	CC Filter (5100K)							Y										Camera Adjustment
22	VFK1375	---->	1.5mm Hex Bit	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	A/C Head Adjustment
23	VFKW1000A	---->	EVR I/F BOX		Y							Y	Y	Y	Y					Electrical Adjustments
24	VFKW1000C	---->	EVR RS-232 Cable		Y							Y	Y	Y	Y					Cable between PC and I/F Box
25	VFK1300	---->	AD Board (DAQ-12)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Tape Interchangeability Adjustment
26	VFK1542	---->	T Arm Height Adj. Tool A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T1 Loading Arm Height Adj.
27	VFK1543	---->	T Arm Height Adj. Tool B	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T1 Loading Arm Height Adj.
	A Kit (VFK101P-KIT : NTSC / VFK101E-KIT : PAL)																			
28	VFK1152	---->	Dial Torque Gauge Adapter	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Adapter for Reel Torque Gauge
29	VFK1153	---->	Mech. Neutral Plate (Post / M)	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y		Post Height Coarse Adjustment
30	VFK1154	---->	Post Height Fixture	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Post Height Coarse Adjustment
31	VFK1155	---->	Neutral Position Tool (White)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Tape Tension Adjustment
32	VFK1156	---->	Neutral Position Tool (Black)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Tape Tension Adjustment
33	VFK1158A	---->	Auto B.E.R. Counter		Y					Y		Y	Y	Y					Y	EO Adjustment (Bit Error Count)
34	VFK1481	---->	LISTA Software	Y	Y	Y	Y	Y	Y	Y	Y						Y		Y	Tape Interchangeability Adjustment
35	VFK1160C	---->	RF Auto Adj. Software	Y	Y	Y	Y					Y								RF Adjustment
36	VFK1162B	---->	EVR Software		Y							Y		Y						Software for EVR
37	VFK1163	---->	EQ. Adjustment Tool	Y						Y	Y						Y			EO Adjustment
38	VFK1180	---->	EVR Sub I/F Board		Y							Y	Y	Y						Electrical Adjustment w/EVR
39	VFK1185	---->	B.E.R. Counter Cable		Y						Y		Y	Y					Y	Cable for B.E.R. Counter
40	VFK1186	---->	LISTA Cable	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Tape Interchangeability Adjustment
41	VFK1187	---->	EVR Cable		Y							Y	Y	Y						Cable for EVR
42	VFK1192	---->	F Extension Board	Y		Y	Y								Y	Y		Y		Circuit Board Extension
43	VFK1193	---->	H Extension Board	Y		Y	Y								Y	Y		Y		Circuit Board Extension
44	VFK1194	---->	Extension Board		Y							Y	Y	Y						Circuit Board Extension
45	VFK1208	---->	Neutral Position Tool (W/Hole)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Tape Tension Adjustment
46	VFK1210	---->	Multi-Canon Cable		Y							Y	Y	Y						Cable for EVR
47	VFM3000ED	---->	DV Alignment Tape (LISTA)	Y		Y	Y	Y	Y		Y						Y			DV Playback Confirmation
48	VFM3010ED	VFM3110ED	DV Alignment Tape (Colour Ba	Y		Y	Y	Y	Y		Y						Y			DV Playback Adjustment
49	VFM3580KM	VFM3680KM	M Alignment Tape (No.1)	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y		Electrical Adjustment
50	VFM3581KM	VFM3681KM	M Alignment Tape (No.2)	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y		Tape Interchangeability Adjustment
51	VFM3582KM	VFM3682KM	M Alignment Tape (No.3)	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y		A/C Head Adjustment
	B Kit (VFK102-KIT)																			
52	VFK1248A	---->	F Memory Version Up Software					Y	Y		Y						Y			Software Version Up
53	VFK1304	---->	F Memory Version Up Tool					Y	Y		Y						Y			Software Version Up
54	VFK1305	---->	Extender Cable (120P)								Y						Y			Cable for Extension
55	VFK1306	---->	Extender Cable (52P)								Y						Y			Cable for Extension
56	VFK1307	---->	Extender Cable (70P)								Y						Y			Cable for Extension
57	VFK1348	---->	Mech. Neutral Plate (Post / L)							Y									Y	Tape Post Height Coarse Adjustment
58	VFK1369	---->	Tape Beg./End Det Cassette (I	Y		Y	Y	Y	Y	Y	Y				Y	Y	Y	Y	Y	Detector Sensitivity Adjustment
	C Kit (VFK103P-KIT : NTSC / VFK103E-KIT : PAL)																			
59	VFK1339	VFK1340	EVR Software							Y									Y	Electrical Adjustment
60	VFK1228	---->	B.E.R. Counter Cable					Y	Y											Cable for B.E.R. Counter
61	VFK1357	---->	Extension Board					Y	Y											Circuit Board Extension
62	VFK1358	---->	Extension Cable (A/C HEAD)					Y	Y											Circuit Board Extension
63	VFM3580KL	VFM3680KL	L Alignment Tape (No.1)	P		P	P	P	P	Y	P				P			P	Y	Electrical Adjustment
64	VFM3581KL	VFM3681KL	L Alignment Tape (No.2)	P		P	P	P	P	Y	P				P			P	Y	Tape Interchangeability Adjustment
65	VFM3582KL	VFM3682KL	L Alignment Tape (No.3)	P		P	P	P	P	Y	P				P			P	Y	A/C Head Adjustment
	D Kit (VFK104-KIT)																			
66	VFK1383	---->	Extender Board												Y					
67	VFK1487	---->	RF Tool Modif. Kit											Y	Y					
68	VFK1468	---->	F Memory Version Up Software											Y						
69	VFK1481	---->	LISTA Software											Y	Y	Y		Y		

Y : Available P : Possible to use

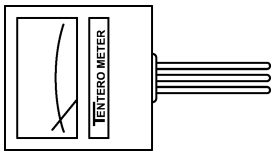
1 **VFK71 :1.5cN-m (150g)**
14 **VFK1191 :0.45cN-m (45g)**
Dial Torque Gauge



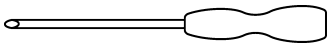
2 **VFK0357 (1.5mm)**
Eccentric Screwdriver



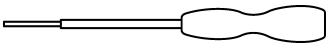
3 **VFK1145 (T2-M30-P)**
Back Tension Meter



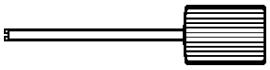
4 **VFK1146**
5 **VFK1147**
Phillips Driver



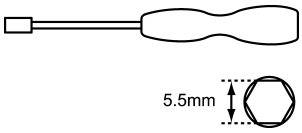
6 **VFK1148 (1.5mm)**
10 **VFK1178 (0.89mm)**
11 **VFK1179 (0.71mm)**
Hex Driver



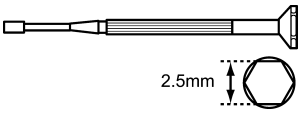
7 **VFK1149 (2.5mm)**
Post Driver



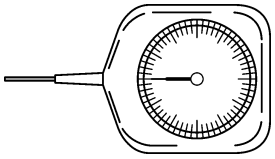
8 **VFK1150 (5.5mm)**
Nut Driver



9 **VFK1151 (2.5mm)**
Nut Driver

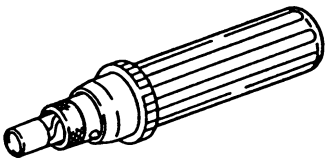


12 **VFK1188 :30mN (30g)**
Dial Tension Gauge



13 **VFK1190**
Hex Wrench

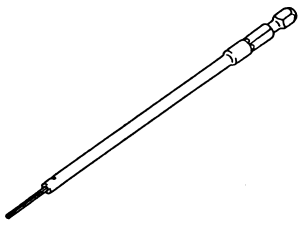
15 **VFK1209 :4-30cN-m (0.4-3Kg)**
Torque Driver



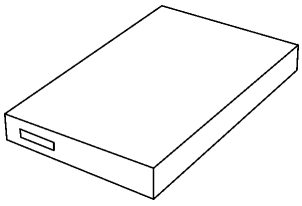
16 **VFK1341 (3600K)**
17 **VFK1342 (4500K)**
18 **VFK1343 (3600K)**
21 **VFK1346 (5100K)**
CC Filter

19 **VFK1345**
CC Filter Folder
20 **VFK1346**
CC Filter Step Down Ring

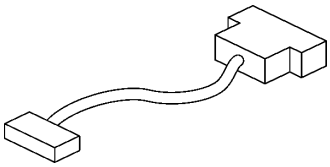
22 **VFK1375 (1.5mm)**
Hex Bit



23 **VFKW1000AA**
EVR I/F Box

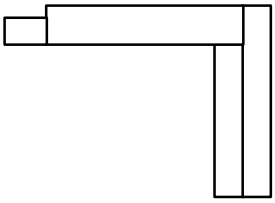


24 **VFKW1000C**
EVR RS-232 Cable

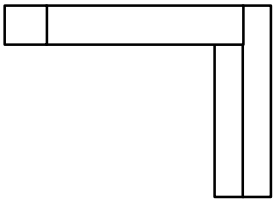


25 **VFK1300**
A/D Board (DAQ-12)

26 **VFK1542**
T Arm Height Adj. Tool A

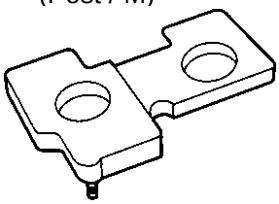


27 **VFK1543**
T Arm Height Adj. Tool B

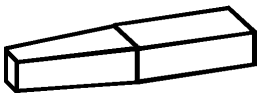


28 **VFK1152**
Dial Torque Gauge Adapter

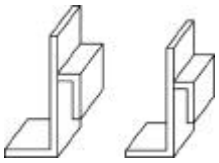
29 **VFK1153**
Mech. Neutral Plate
(Post / M)



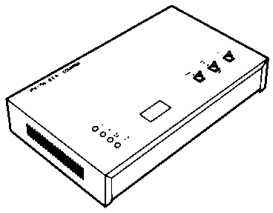
30 **VFK1154**
Post Height Fixture



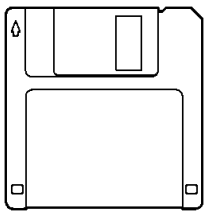
31 **VFK1155 (Silver)**
REV Position Tool
32 **VFK1156 (Black)**
PLAY Position Tool



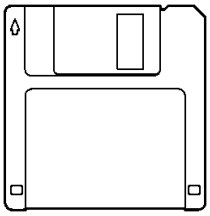
33 **VFK1158A**
Auto B.E.R Counter



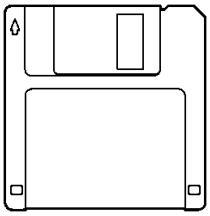
34 **VFK1481**
LISTA Software



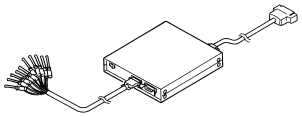
35 **VFK1160C**
RF Auto Adj. Software



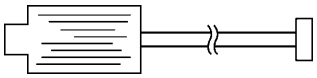
36 **VFK1162B**
EVR Software



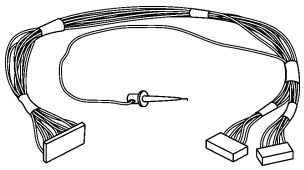
37 **VFK1163**
E.Q. Adjustment Tool



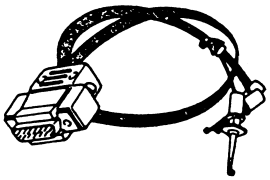
38 **VFK1180**
EVR Sub I/F Board



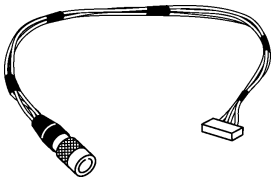
39 **VFK1185**
BER Counter Cable



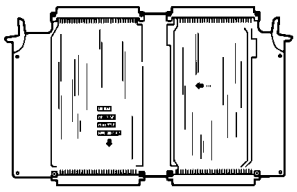
40 **VFK1186**
LISTA Cable



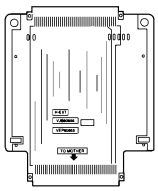
41 **VFK1187**
EVR Cable



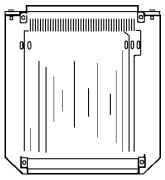
42 **VFK1192 (F)**
Extension Board



43 **VFK1193 (H)**
Extension Board



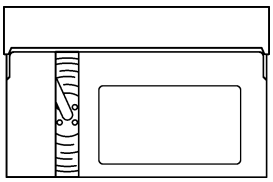
44 **VFK1194**
Extension Board



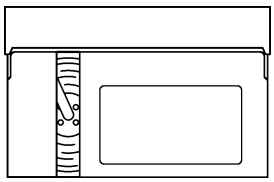
45 **VFK1208**
Neutral Position Tool

46 **VFK1210**
Multi-Canon Cable

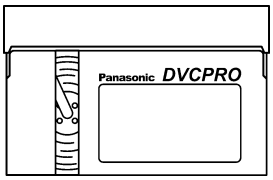
47 **VFM3000EDS**
DV Alignment Tape



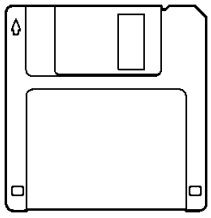
48 **VFM3010EDS**
DV Alignment Tape



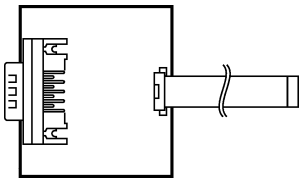
49 **VFM3580KM**
50 **VFM3581KM**
51 **VFM3582KM**
M Alignment Tape



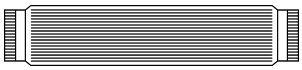
52 **VFK1248K**
Flash Memory
Version Up Software



53 **VFK1304**
Flash Memory
Version Up Tool

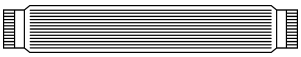


54 **VFK1305 (120P)**
Extension Board

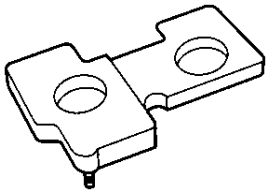


55 **VFK1306 (52P)**
Extension Board

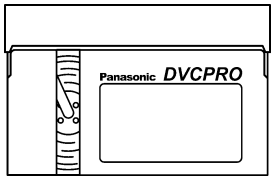
56 **VFK1307 (70P)**
Extension Board



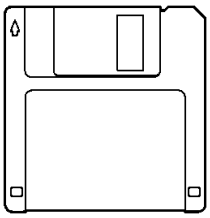
57 **VFK1348**
Mech. Neutral Plate
(Post /L)



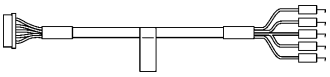
58 **VFK1339**
Tape Beg./ End. Det.
Cassette (L)



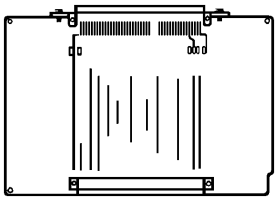
59 **VFK1339**
EVR Software



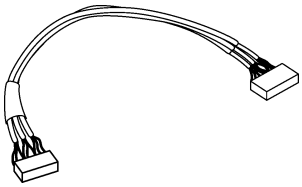
60 **VFK1228**
B.E.R. Counter Cable



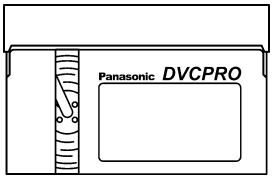
61 **VFK1357**
Extension Board



62 **VFK1358**
Extension Cable (A/C Head)



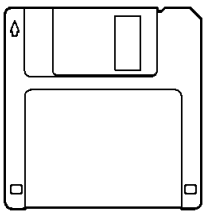
63 **VFM3580KL (No. 1)**
64 **VFM3581KL (No. 2)**
65 **VFM3582KL (No. 3)**
L Alignment Tape



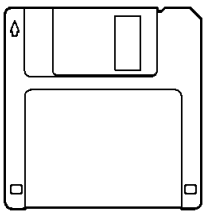
66 **VFK1383**
Extension Board

67 **VFK1487**
RF Tool Modif. Kit

68 **VFK1468**
Flash Memory
Version Up Software



69 **VFK1481**
LISTA Software



4. Alignment Tapes

4-1. DCVPRO Alignment Tape

4-1-1. VFM3580KM (NTSC)

Time	VIDEO		PCM		CUE	
(min)	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	Color Bar SMPTE(75%)	Composite Video Level Confirmation	1KHz -20dB	Audio Level Confirmation	1KHz 0VU	CUE Level Confirmation
7:00	Color Bar (100%)	Component Video Level Confirmation				
14:00	H Sweep	Frequency Response			6KHz 0VU	A/C Head Azimuth
18:00	Bowtie (500K)	Y/C Timing				
22:00	Pulse & Bar	Y/C Timing			300,500,1K 2K,4K,6KHz	Frequency Response
26:00	Area Markers				-----	-----

4-1-2. VFM3581KM (NTSC)

Time	VIDEO		PCM		CUE	
(min)	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	ITI Pattern	Linearity Adjustment	---	---	---	---

4-1-3. VFM3582KM (NTSC)

Time	VIDEO		PCM		CUE	
(min)	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	Color Bar (75%) w/ REF	X-Value Adjustment	---	---	6KHz 10VU	X-Value Adjustment

4-1-4. VFM3380KM (NTSC)

DVC PRO 50 Alignment Tape

4-1-5. VFM3583KM (NTSC)

RF Auto EQ Alignment Tape

4-1-6. VFM3680KM (PAL)

Time	VIDEO		PCM		CUE	
(min)	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	Color Bar 100%	Video Level Confirmation	1KHz -18dBu	Audio Level Confirmation	1KHz Reference Level	CUE Level Confirmation
10:00	H Sweep	Frequency Response				
14:00	Area Makers				6KHz Reference Level	A/C Head Azimuth
18:00	Bowtie (500K)	Y/C Timing				
22:00	Pulse & Bar	Y/C Timing			1KHz 300KHz~6KHz	Frequency Response
26:00 30:00	Multi Pulse	Y/C Timing				

4-1-7. VFM3681KM (PAL)

Time	VIDEO		PCM		CUE	
(min)	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00 20:00	ITI Pattern	Linearity Adjustment	---	---	---	---

4-1-8. VFM3682KM (PAL)

Time	VIDEO		PCM		CUE	
(min)	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00 10:00	Color Bar (75%) w/ REF	X-Value Adjustment	---	---	6KHz 10VU	X-Value Adjustment

4-1-9. VFM3480KM

DVC PRO 50 Alignment Tape

4-1-10. VFM3683KM

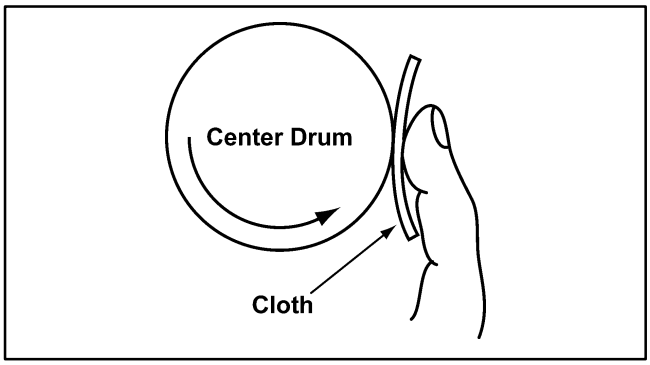
RF Auto EQ Alignment Tape

5. Cleaning Procedures

NOTE : Turns power off during cleaning.
Make sure the power is OFF before cleaning.
Use ethanol (more than 99% purity) as cleaning liquid.

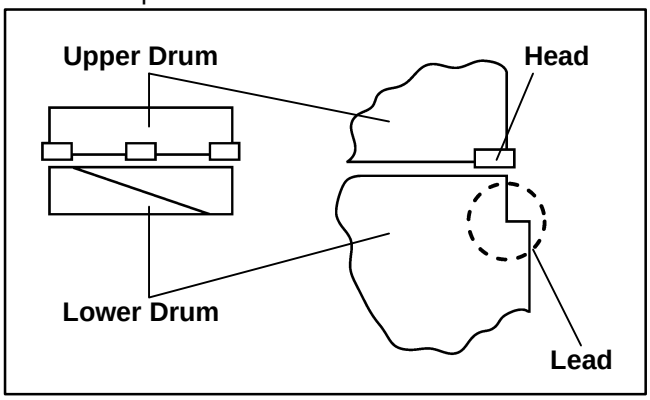
5-1 Cleaning of Head Chips : (Daily)

Clean heads by applying even pressure and rotating cylinder a few times. Never wipe in up and down motion. Never touch a cylinder by naked hand. First wipe with a cloth soaked by cleaning liquid. Then wipe with dry cloth.



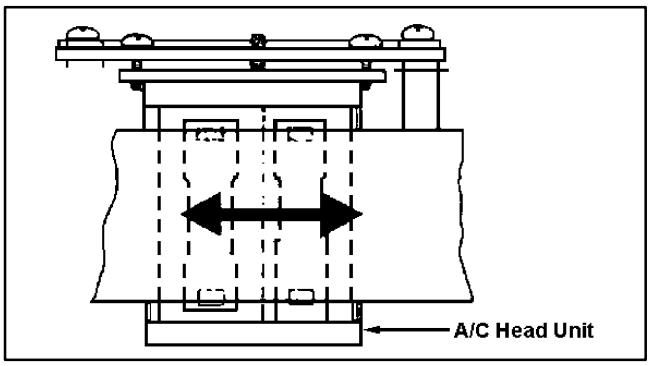
5-2. Cleaning of Drum Lead : (Weekly)

Be careful not to touch a head chip. Clean the drum lead with a pick.



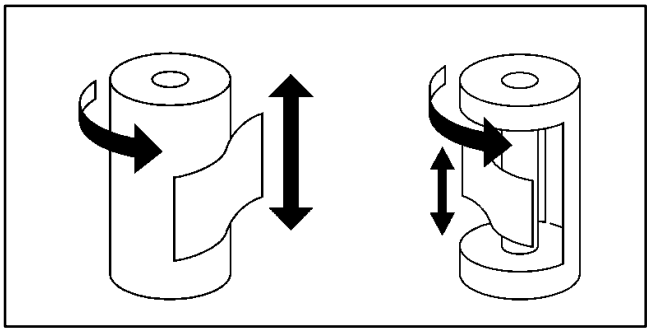
5-3. Cleaning of A/C Head : (Weekly)

Wipe the A/C head with a cloth soaked by cleaning liquid. Wipe again with a dry cloth.



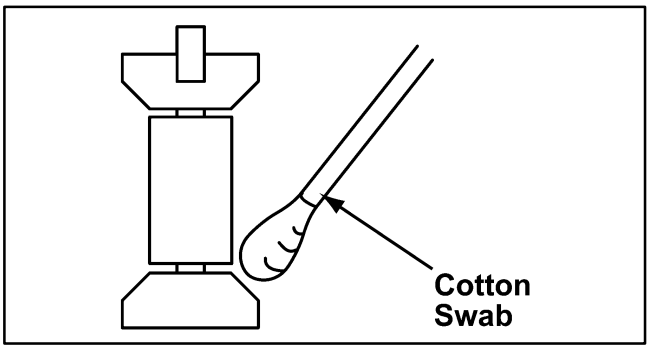
5-4. Cleaning of Pinch Roller and Capstan : (Weekly)

Wipe the Pinch Roller and Capstan with a cloth soaked by cleaning liquid.



5-5. Cleaning of Post : (Weekly)

Wind a cloth on a pick. Wipe each post dry with that pick . Wipe again with a dry cloth. For metal posts wipe with cleaning liquid. Then wipe dry again.



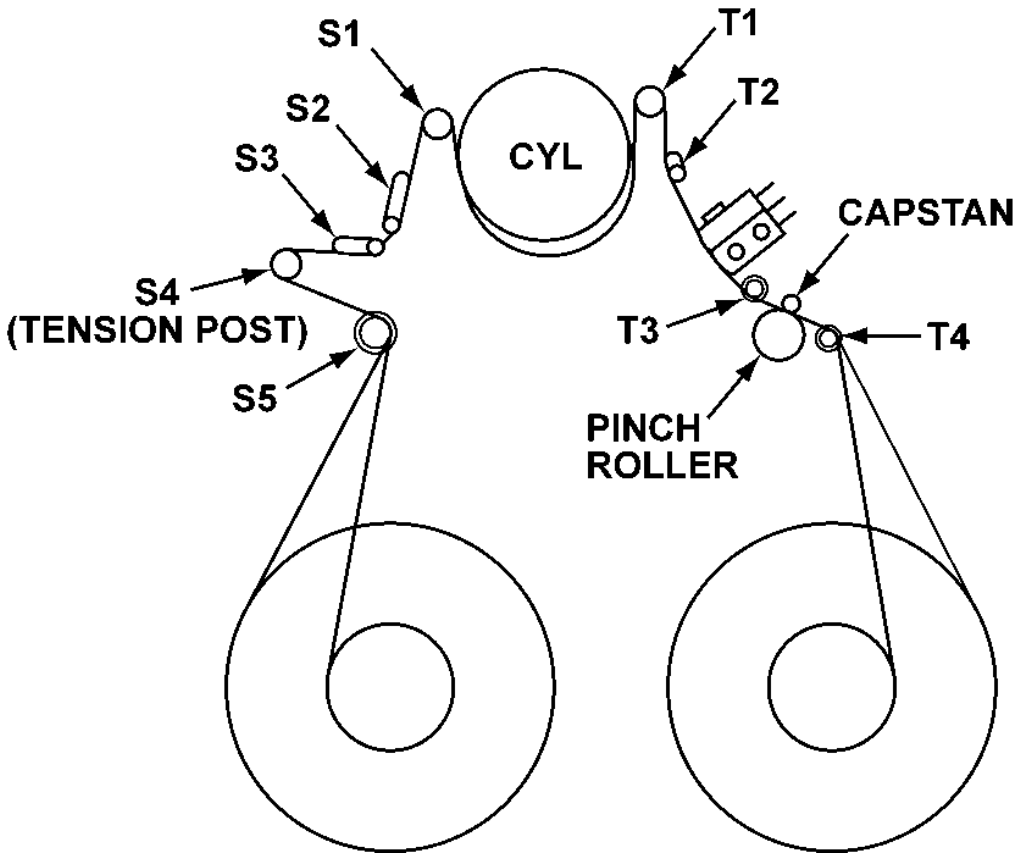
NOTE:
Use the clean cloth for cleaning purpose. Do not use any dirty cloth.
The Cleaning Cloth can be ordered as spare part.
The part number indicated as below.
CLEANING CLOTH : VZZ0095

SECTION 2

MECHANICAL ADJUSTMENT

CONTENTS

1. Name of Tape Transportation



2. Table of Test Point

2-1. AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D750, AJ-D850

<Table of Test Point>

Name		Correspondence Model	
		AJ-D750, AJ-D850	AJ-D440, AJ-D450, AJ-D640, AJ-D650
[Tension Arm Adjustment]			
TENSION		SERVO (F1) : TP201	←
TENSION OFFSET		MECHA I/F : VR1	←
TENSION GAIN		MECHA I/F : VR2	←
[Photo Sensor Voltage Adjustment]			
S-side Output		SYSCON (F2) : P2 – 25PIN	←
T-side Output		SYSCON (F2) : P2 – 26PIN	←
Adjustment Point		MECHA I/F : SW200	←
[Tape Pass, A/C Head Adjustment]			
R/P-ENV		RF (H4) : TP16	←
PB/ENV		RF (H4) : TP15	←
R/P-HSW		SERVO (F1) : TP233	←
PB-HSW		SERVO (F1) : TP232	←
LIVE-CTL		SERVO (F1) : TP30	←
CUE		CUE (H2) : TP101	ADDA-CUE (F8) : TP381
[LISTA Adjustment]			
ATF ERR		SERVO (F1) : TP321	←
TRG	R/P HSW	SERVO (F1) : TP233	←
	PB HSW	SERVO (F1) : TP232	←
GND		SERVO (F1) : TG510	←
ATF GAIN		Select the EVR on the Service Menu. (Refer to below table <LISTA Adjustment Mode>)	←

<A/C Head Adjustment Mode>

Adjustment Name	Adjustment Mode (Select on the Service Menu)
Azimuth, X value Adj.	Select the item “A07 : RP LINEAR P”.

<LISTA Adjustment Mode>

Adjustment Name	Adjustment Mode	
	Service Menu Item	TRG Connection
Sens. Adjustment R/P Head	“A06 : RP GAIN P”	R/P HSW
Sens. Adjustment PB Head	“A04 : PB GAIN P”	PB HSW
Sens. Adjustment R/P Head (DV)	“A08 : RP GAIN”	R/P HSW
Linearity Adjustment	“A07 : RP LINEAR P”	R/P HSW

2-2. AJ-LT75, AJ-LT85

<Table of Test Point>

Name		AJ-LT75, AJ-LT85	
		VTR 1 (DIGITAL 1 PCB)	**VTR 2 (DIGITAL 2 PCB)**
[Tension Arm Adjustment]			
TENSION		TP35701	TP33001
TENSION OFFSET		"A05 : TENSION OFST" (Service Menu)	←
TENSION GAIN		VR5701	VR3001
[Photo Sensor Voltage Adjustment for AJ-LT85 only] (Refer to Electrical Adjustment on the Service Manual about AJ-LT75.)			
S-Side	Sensor Voltage	TP601	TP61301
	Adjust Point	VR601	VR61301
T-Side	Sensor Voltage	TP602	TP61302
	Adjust Point	VR602	VR61302
[Tape Pass, A/C Head Adjustment]			
R/P-ENV		TP5001	←
PB/ENV		TP5101	←
R/P-HSW		TP6001	←
PB-HSW		TP6002	←
CUE		TP40701 (ANALOG 1 PCB)	TP45701 (ANALOG 2 PCB)
LIVE-CTL		TP35705	TP33005
[LISTA Adjustment]			
ATF ERR		TP35706	TP33006
TRG	R/P HSW	TP5001	←
	PB HSW	TP5101	←
GND		TG35708	TG3008
ATF GAIN		Select the EVR on the Service Menu. (Refer to below table <LISTA Adjustment Mode>)	←

<A/C Head Adjustment Mode>

Adjustment Name	Adjustment Mode (Select on the Service Menu)
Azimuth, X value Adj.	Select the item "A09 : RP LINEAR".

<LISTA Adjustment Mode>

Adjustment Name	Adjustment Mode	
	Service Menu Item	**TRG Connection**
Sens. Adjustment R/P Head	"A13 : RP GAIN"	R/P HSW
Sens. Adjustment PB Head	"A12 : PB GAIN"	PB HSW
Sens. Adjustment R/P Head (DV)	"A14 : DV GAIN"	R/P HSW
Linearity Adjustment	"A09 : RP LINEAR"	R/P HSW

2-3. AJ-D220, AJ-D230, AJ-D230H, AJ-D250

<Table of Test Point>

Name		Correspondence Models	
		AJ-D220, AJ-D230, AJ-D230H	AJ-D230-E, AJ-D230H-E, AJ-D250
[Tension Arm Adjustment]			
TENSION		RF : TP5901	←
TENSION OFFSET		"A05 : TENSION OFST" (Service Menu)	←
TENSION GAIN		VR9501	←
[Photo Sensor Voltage Adjustment]			
S-Side	Sensor Voltage	AV SYSCON : TP60001	AV SYSCON : TP60002
	Adjust Point	AV SYSCON : VR60001	AV SYSCON : VR60002
T-Side	Sensor Voltage	AV SYSCON : TP60002	AV SYSCON : TP60001
	Adjust Point	AV SYSCON : VR60002	AV SYSCON : VR60001
[Tape Pass, A/C Head Adjustment]			
R/P-ENV		RF : TP5251	←
PB/ENV		"B05 : PB HEAD" on the Service Menu.	
R/P-HSW		RF : TP5759	←
PB-HSW		RF : TP5757	←
CUE		AUDIO : TP4401	AUDIO : TP40701
LIVE-CTL		RF : TP5903	←
[LISTA Adjustment]			
ATF ERR		RF : TP5902	←
TRG (R/P HSW)		RF : TP5759	←
GND		RF : TG751	←
ATF GAIN		"A13 : RP GAIN" on the Service Menu.	←

<A/C Head Adjustment Mode>

Adjustment Name	Adjustment Mode (Select on the Service Menu)
Azimuth, X value Adj.	Select the item "A09 : RP LINEAR".

<LISTA Adjustment Mode>

Adjustment Name	Adjustment Mode	
	Service Menu Item	TRG Connection
Sens. Adjustment R/P Head	"A13 : RP GAIN"	R/P HSW
Linearity Adjustment	"A09 : RP LINEAR"	R/P HSW

2-4. AJ-DE77, AJ-D780

<Table of Test Point>

Name	Correspondence Model	
	AJ-DE77	AJ-D780
[Tension Arm Adjustment]		
TENSION	SERVO (F1) : TP201	←
TENSION OFFSET	MECHA I/F : VR1	←
TENSION GAIN	MECHA I/F : VR2	←
[Photo Sensor Voltage Adjustment]		
S-side Output	SYSCON (F2) : P2 – 25PIN	←
T-side Output	SYSCON (F2) : P2 – 26PIN	←
Adjustment Point	MECHA I/F : SW200	←
[Tape Pass, A/C Head Adjustment]		
ENV L13	RF (H1) : TP15	RF (H3) : TP15
ENV L24	RF (H1) : TP16	RF (H3) : TP16
ENV R13	RF (H2) : TP15	RF (H4) : TP15
ENV R24	RF (H2) : TP16	RF (H4) : TP16
FP-S0 (FRAME PULSE)	SERVO (F1) : TP301	←
HSW L13	SERVO (F1) : TP722	←
HSW L24	SERVO (F1) : TP723	←
LIVE-CTL	SERVO (F1) : TP30	←
CUE	CUE (H2) : TP101	ADDA-CUE (F8) : TP381
[LISTA Adjustment]		
ATF ERR L13	SERVO (F1) : TP732	←
ATF ERR L24	SERVO (F1) : TP833	←
TRG (HSW L13)	SERVO (F1) : TP722	←
GND	SERVO (F1) : TG510	←
ATF GAIN	Select the EVR on the Service Menu. (Refer to below table <LISTA Adjustment Mode>)	←

<A/C Head Adjustment Mode>

Adjustment Name	Adjustment Mode (Select on the Service Menu)
X Value Correction	AJ-DE77 : “A09 : X VALUE”, AJ-D780 : “A06 : X VALUE”

<LISTA Adjustment Mode>

Adjustment Name	Adjustment Mode	
	Service Menu Item	TRG Connection
Sens. Adjustment R/P Head	“A04 : LR GAIN P”	HSW L13
Linearity Adjustment	“A07 : LR LINEAR P”	HSW L13

2-5. AJ-D200, AJ-D210, AJ-D215, AJ-D610, AJ-D700, AJ-D800, AJ-D810

<Table of Test Point>

Name		Correspondence Models				
		AJ-D700, AJ-D800	AJ-D200, AJ-D210, AJ-D215	AJ-D610, AJ-D810		
[Format Select]						
Format Select				SERVO SW901	NTSC 1:ON 2:OFF	PAL
[Reel Torque Adjustment]						
S-Side	Reel Voltage	SERVO : TP301	←	←		
	Adjust Point	SERVO : VR502	←	←		
T-Side	Reel Voltage	SERVO : TP302	←	←		
	Adjust Point	SERVO : VR501	←	←		
GND		SERVO : TG300	←	←		
[Tension Arm Adjustment]						
TENSION		SERVO : TP402	←	←		
TENSION OFFSET		SERVO : VR402	←	←		
TENSION GAIN		SERVO : VR401	←	←		
[Photo Sensor Voltage Adjustment]						
S-Side	Sensor Voltage		SERVO : TP503	←		
	Adjust Point		SERVO : VR503	←		
T-Side	Sensor Voltage		SERVO : TP504	←		
	Adjust Point		SERVO : VR504	←		
[Tape Pass, A/C Head Adjustment]						
RP-ENV		RF : TP500	←	←		
RP-HSW		RF : TP300	←	←		
CUE		LCD : TP505	JACK : TP2	LCD : TP505		
LIVE-CTL		SERVO : TP107	←	←		
[PG Shifter Adjustment]						
TSR		SERVO : TP501	←	←		
SPA		SERVO : TP102	←	←		
PG SHIFT		SERVO : VR101	←	←		
[LISTA Adjustment]						
ATF ERR		SERVO : TP115	←	SERVO : TP601		
TRG (R/P HSW)		SERVO : TP113	←	←		
GND		SERVO : TG300	←	←		
ATF GAIN		LISTA Software	←	←		

<How to set the Reel Adjustment Mode>

Adjustment Name	Adjustment Mode	
	Adjustment Mode Name	Mode Change Procedure
Reel Torque Adjustment	Reel Adjustment Mode	(1) Short the TP505 and TP116 with power OFF. (2) Turn ON the power and playback.

<How to set the LISTA Adjustment Mode>

Adjustment Name	Adjustment Mode	
	Adjustment Mode Name	Mode Change Procedure
Sens. Adjustment (R/P Head)	"RP GAIN P"	(1) Short the TP902 and TP116 with power OFF. (2) Turn ON the power and playback.

Linearity Adjustment	“RP LINEAR P”	(1) Short the TP902, TP116 and TP101 with power OFF. (2) Turn ON the power and playback.

2-6. AJ-D950, AJ-D950A

<Table of Test Point>

Name		AJ-D950, AJ-D950A
[Tension Arm Adjustment]		
TENSION		SERVO (F1) : TP201
TENSION OFFSET		MECHA I/F : VR1
TENSION GAIN		MECHA I/F : VR2
[Photo Sensor Voltage Adjustment]		
S-side Output		SYSCON (F2) : P2 – 25PIN
T-side Output		SYSCON (F2) : P2 – 26PIN
Adjustment Point		MECHA I/F : SW200
[Tape Pass, A/C Head Adjustment]		
R/P-ENV L		RF (H3) : TP201
R/P-ENV R		RF (H4) : TP201
PB-ENV L		RF (H3) : TP101
PB-ENV R		RF (H4) : TP101
FP-S0 (FRAME PULSE)		SERVO (F1) : TP301
R/P-HSW L		SERVO (F1) : TP722
PB-HSW L		SERVO (F1) : TP723
LIVE-CTL		SERVO (F1) : TP30
CUE		CUE (H1) : TP101
[LISTA Adjustment]		
ATF ERR		SERVO (F1) : TP732
TRG	R/P-HSW L	SERVO (F1) : TP722
	PB-HSW L	SERVO (F1) : TP723
GND		SERVO (F1) : TG510
ATF GAIN		Select the EVR on the Service Menu. (Refer to below table <LISTA Adjustment Mode)

<A/C Head Adjustment Mode>

Adjustment Name	Format Select	Adjustment Mode (Select on the Service Menu)
Azimuth, X Value Adj.	25M	Select the item “A10 : RP LINEAR DP”.
	50M	Select the item “A06 : RP LINEAR ED”.

<LISTA Adjustment Mode>

Adjustment Name	Adjustment Mode		
	Format Select (LISTA Software)	Service Menu Item	TRG Connection
Sens. Adjustment (R/P Head)	50M mode	“A05 : RP GAIN ED”	R/P-HSW L
Linearity Adjustment		“A06 : RP LINEAR ED”	R/P-HSW L
Sens. Adjustment (PB Head)		“A07 : PB GAIN ED”	PB-HSW L
Sens. Adj. (R/P Head) 25M compatible	25M mode	“A09 : RP GAIN DP”	R/P-HSW L
Linearity Adjustment 25M compatible		“A10 : RP LINEAR DP”	R/P-HSW L
Sens. Adj. (PB Head) 25M compatible		“A11 : PB GAIN DP”	PB-HSW L

2-7. AJ-D90, AJ-D900, AJ-D910WA, AJ-PD900

<Table of Test Point>

Name		AJ-D90, AJ-D900, AJ-D910WA, AJ-PD900
[Reel Torque Adjustment]		
S-Side	Reel Voltage	SERVO : TP301
	Adjust Point	SERVO : VR502
T-Side	Reel Voltage	SERVO : TP302
	Adjust Point	SERVO : VR501
GND		SERVO : TG300
[Tension Arm Adjustment]		
TENSION		SERVO : TP402
TENSION OFFSET		SERVO : VR402
TENSION GAIN		SERVO : VR401
[Photo Sensor Voltage Adjustment]		
S-Side	Sensor Voltage	SERVO : TP503
	Adjust Point	SERVO : VR503
T-Side	Sensor Voltage	SERVO : TP504
	Adjust Point	SERVO : VR504
[Tape Pass, A/C Head Adjustment]		
R/P-ENV L		RF : CONNECTOR P4 (Distributed by BER Counter Tool.)
PB-ENV L		
R/P-HSW L		
PB-HSW L		
R/P-ENV R		RF : CONNECTOR P5 (Distributed by BER Counter Tool.)
PB-ENV R		
R/P-HSW R		
PB-HSW R		
CUE		LCD : TP505
LIVE-CTL		SERVO : TP107
[LISTA Adjustment]		
ATF ERR		SERVO : TP601
TRG (R/P-HSW)		SERVO : TP113
GND		SERVO : TG300
ATF GAIN		EVR

NOTE

SW setting for Format Select (SERVO PCB)

		NTSC	PAL
SW901	1	OFF	OFF
	2	OFF	ON

→

Connector	Pin Position
P4	5 : HID RP L
	6 : D GND
	7 : RP ENV L
	8 : PB ENV L
	9 : A GND
P5	5 : HID RP R
	6 : D GND
	7 : RP ENV R
	8 : PB ENV R
	9 : A GND

<How to set the Reel Adjustment Mode>

Adjustment Name	Adjustment Mode	
	Mode Name	Mode Change Procedure
Reel Torque Adjustment	Reel Adjustment Mode	(1) Short the TP505 and TP116 with power OFF. (2) Turn ON the power and playback.

<how to set the LISTA Adjustment Mode>

Adjustment Name	Adjustment Mode		
	Mode Name	Format Select (LISTA Software)	TRG Connection
Sensitivity Adj. (R/P)	"RP GAIN ED"	50M mode	(1) Short the TP902 and TP116 with power OFF. (2) Turn ON the power and playback.
Linearity Adj.	"RP LINEAR ED"		(1) Short the TP902,TP116 and TP101 with power OFF. (2) Turn ON the power and playback.
Sensitivity Adj. (R/P) 25M compatible	"RP GAINDP"	25M mode	(1) Short the TP902 and TP116 with power OFF. (2) Turn ON the power and playback.
Linearity Adjustment 25M compatible	"RP LINEAR DP"		(1) Short the TP902,TP116 and TP101 with power OFF. (2) Turn ON the power and playback.

2-8. AJ-D92, AJ-D94, AJ-D95DC

<Table of Test Point>

Name		Correspondence Model	
		AJ-D95DC	AJ-D92, AJ-D94
[Tension Arm Adjustment]			
TENSION		RF : TP11	RF : TP1
TENSION OFFSET		"A05 : TENSION OFST" (Service Menu)	←
TENSION GAIN		AV SYS : VR1103	AV SYS : VR1101
[Photo Sensor Voltage Adjustment]			
S and T Sensor Voltage		"I02 : S PHOTO / T PHOTO" (Display on the Service Menu)	←
S-side Adjustment Point		AV SYS : VR1102	←
T-side Adjustment Point		AV SYS : VR1101	AV SYS : VR1103
[Tape Pass, A/C Head Adjustment]			
R/P-ENV L		RF : TP401 (R/P or PB ENV Change on the Service Menu)	←
PB-ENV L			
R/P-ENV R		RF : TP501 (R/P or PB ENV Change on the Service Menu)	←
PB-ENV R			
R/P-HSW L		RF : TP903	←
PB-HSW L		RF : TP905	←
LIVE-CTL		RF : TP12	RF : TP2
CUE		AUDIO : TP40501	AUDIO : TP102
[LISTA Adjustment]			
ATF ERR		RF : TP13	RF : TP3
TRG	R/P-HSW L	RF : TP903	←
	PB-HSW L	RF : TP905	←
GND		RF : TG901	←
ATF GAIN		Select the EVR on the Service Menu. (Refer to below table <LISTA Adjustment Mode>)	

<A/C Head Adjustment Mode>

Adjustment Name	Format Select	Adjustment Mode (Select on the Service Menu)
Azimuth, X Value Adj.	25M	Select the item "A13 : RP LIN 25M"
	50M	Select the item "A09 : RP LIN 50M"

<LISTA Adjustment Mode>

Adjustment Name	Adjustment Mode		
	Format Select (LISTA Software)	Service Menu Item	TRG Connection
Sens. Adjustment (R/P Head)	50M mode	"A08 : RP GAIN 50M"	R/P-HSW L
Linearity Adjustment		"A09 : RP LIN 50M"	R/P-HSW L
Sens. Adjustment (PB Head)		"A10 : PB GAIN 50M"	PB-HSW L
Sens. Adj. (R/P Head) 25M compatible	25M mode	"A12 : RP GAIN 25M"	R/P-HSW L
Linearity Adjustment 25M compatible		"A13 : RP LIN 25M"	R/P-HSW L
Sens. Adj. (PB Head) 25M compatible		"A14 : PB GAIN 25M"	PB-HSW L

2-9. AJ-D940

<Table of Test Point>

Name		AJ-D940
[Tension Arm Adjustment]		
TENSION		SERVO (F1) : TP201
TENSION OFFSET		MECHA I/F : VR1
TENSION GAIN		MECHA I/F : VR2
[Photo Sensor Voltage Adjustment]		
S-side Output		SYSCON (F2) : P2 – 25PIN
T-side Output		SYSCON (F2) : P2 – 26PIN
Adjustment Point		MECHA I/F : SW200
[Tape Pass, A/C Head Adjustment]		
PB-ENV L13		RF (H3) : TP17
PB-ENV L24		RF (H3) : TP19
PB-ENV R13		RF (H4) : TP17
PB-ENV R24		RF (H4) : TP19
DV-ENV L12		RF (H2) : TP17
DV-ENV R12		RF (H2) : TP19
TSR		SERVO (F1) : TP300
FP-S0 (FRAME PULSE)		SERVO (F1) : TP301
PB-HSW L13		SERVO (F1) : TP722
PB-HSW L24		SERVO (F1) : TP723
PB-HSW R13		SERVO (F1) : TP724
PB-HSW R24		SERVO (F1) : TP725
DV-HSW L12		SERVO (F1) : TP902
DV-HSW R12		SERVO (F1) : TP901
LIVE-CTL		SERVO (F1) : TP30
CUE		CUE (H1) : TP101
[LISTA Adjustment]		
ATF ERR L		SERVO (F1) : TP732
ATF ERR R		SERVO (F1) : TP734
TRG	PB-HSW L13	SERVO (F1) : TP722
	DV-HSW R12	SERVO (F1) : TP901
GND		SERVO (F1) : TG510
ATF GAIN		Select the EVR on the Service Menu. (Refer to below table <LISTA Adjustment Mode>)

<A/C Head Adjustment Mode>

Adjustment Name	Format Select	Adjustment Mode (Select on the Service Menu)
Azimuth, X Value Adj.	50M	Select the item “A05 : PBL13 LINEAR”

<LISTA Adjustment Mode>

Adjustment Name	Adjustment Mode			
	Format Select (LISTA Software)	Service Menu Item	Connection Point	
			ATF ERR	TRG
Sens. Adj. (DVL Head)	50M mode	“A10 : DVL GAIN”	ATF ERR L	DV-HSW L12
Linearity Adjustment		“A11 : DVL LINEAR”		
Sens. Adj. (PBL Head)		“A04 : PBL13 GAIN”		PB-HSW L13
Sens. Adj. (PBR Head)		“A08 : PBR13 GAIN”	ATF ERR R	PB-HSW R13
Sens. Adj. (DVR Head)		“A12 : DVR GAIN”		DV-HSW R12

<CTL Control Mode>

Adjustment Name	Format Select	Adjustment Mode (Select on the Service Menu)
ENV Waveform Confirmation	25M (CTL control)	“A14 : ENV SEL 25M” “A15 : TRK VAL 25M”

3. Mechanical Adjustment Procedure

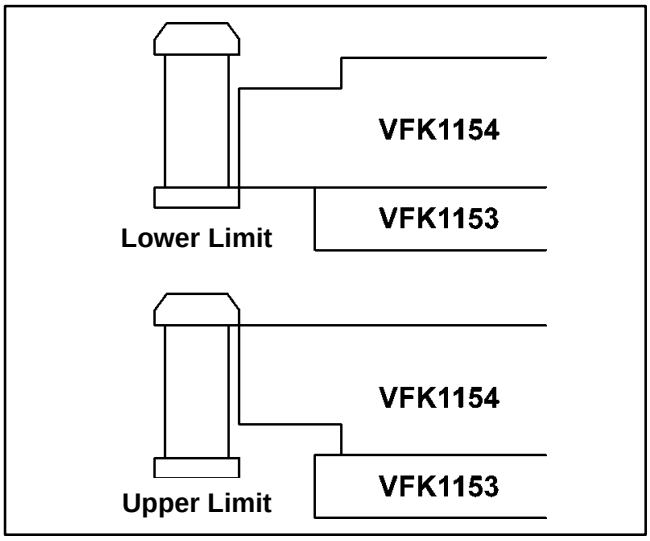
3-1. Post Height Pre-adjustment

MODE	EJECT (POWER OFF)
TOOL	VFK1153 (Mech. Neutral Plate) VFK1154 (Post Height Fixture)

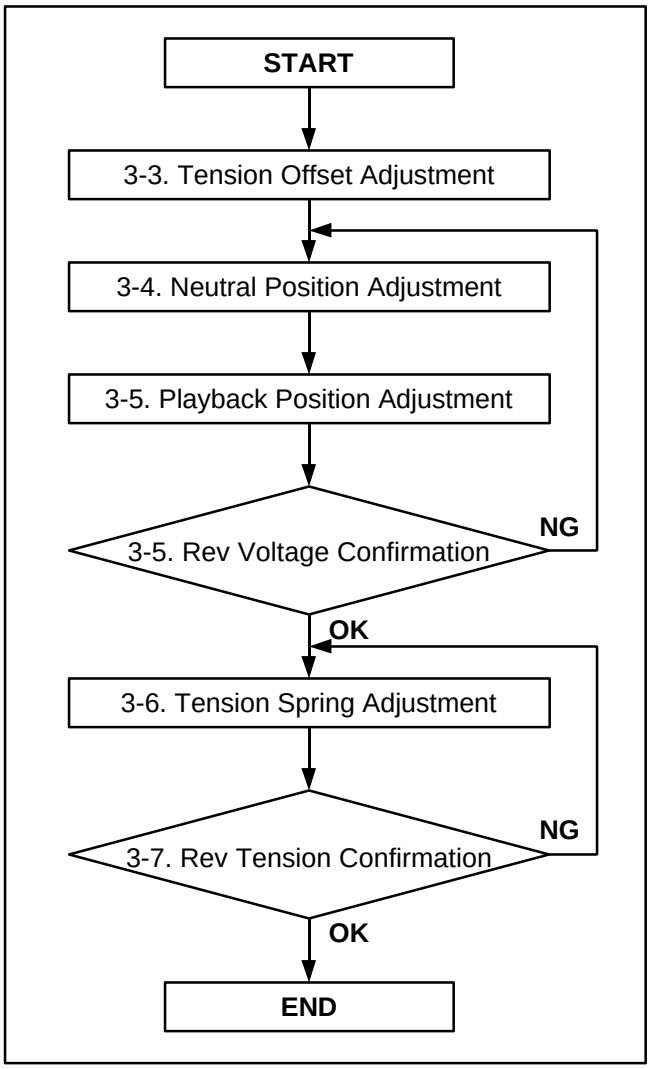
1. Confirm that the Reel Table is located at M-Cassette position.
2. Install the Mech. Neutral Plate (VFK1153) and adjust each post height as shown in figure.
3. Adjust the each post to Lower limit by VFK1154 as shown in figure.
4. VFK1149 use for Post height adjustment of S4 and S5 post. VFK1151 use for Post height adjustment of T3 and T4 post.

Post	Limit	Post Driver
S5 Post	Lower **: NOTE**	VFK1149
S4 Post	Lower **: NOTE**	VFK1149
T3 Post	Lower	VFK1151(2.5mm Nut Driver)
T4 Post	Lower	VFK1151(2.5mm Nut Driver)

NOTE :
Turn S4 and S5 posts 1 round more counterclockwise from lower limit.



3-2. Tension Adjustment Flowchart



1.

3-3. Tension Arm Offset Adjustment

SPEC	2.5 V ± 0.05 V
TEST POINT	Tension: Refer to item “2. Table of Test Point”
ADJ.	Tension Offset : Refer to item “2. Table of Test Point”
MODE	EJECT
TOOL	Digital Volt Meter

1. Confirm that the DC voltage at Test Point is within specification.
2. If it out of spec, Adjust adjustment VR so that the DC voltage is within specification.

3-4. Tension Arm Neutral Position Adjustment

SPEC	2.5 V ± 0.1 V
TEST POINT	Tension : Refer to table of Test Point
ADJ.	Base position of Tension Regulator Board
MODE	STOP
TOOL	Digital Volt Meter VFK1208 (black with hole)

NOTE 1 :

Regarding to no tape loading procedure, refer to item **“4. No Tape Loading procedure”**. And if the model number does not mentioned on Classified list, refer to Service manual about procedure.

NOTE 2 :

Do not use magnetized tweezers and Screw driver.

Do not touch the magnetize Screw driver to S-Reel FG magnet portion, when the lever (D) portion is adjusting.

<In case of model except CAM CORDER>

1. Unscrew the 2 screws and remove the Carriage Support Panel on the Front Loading Unit.
2. Disconnect the connector P3 on the Carriage Board of the Front Loading Unit.
3. Unscrew the 6 screws and remove the Top Plate on the Front Loading Unit as shown in figure 3-4-

<In case of model CAM CORDER>

1. Remove the Cassette Up Unit.

<Common procedure>

1. Set the VFK1208 (black with hole) as position as shown in figure 3-4-2.
2. Connect the Digital Volt Meter to Test point.
3. Place the unit into the no tape loading mode.
4. Loosen the screw (A) and move the lever (D) with tweezers for adjust the sensor position so that the DC voltage at Test Point is within specification.

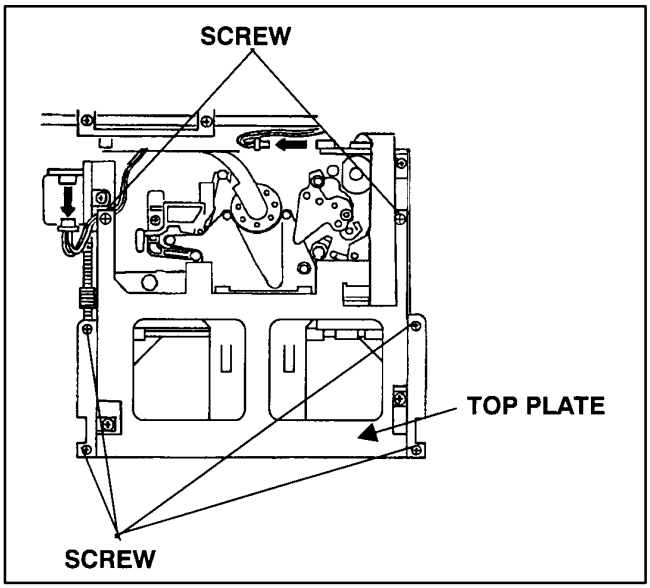


Figure 3-4-1

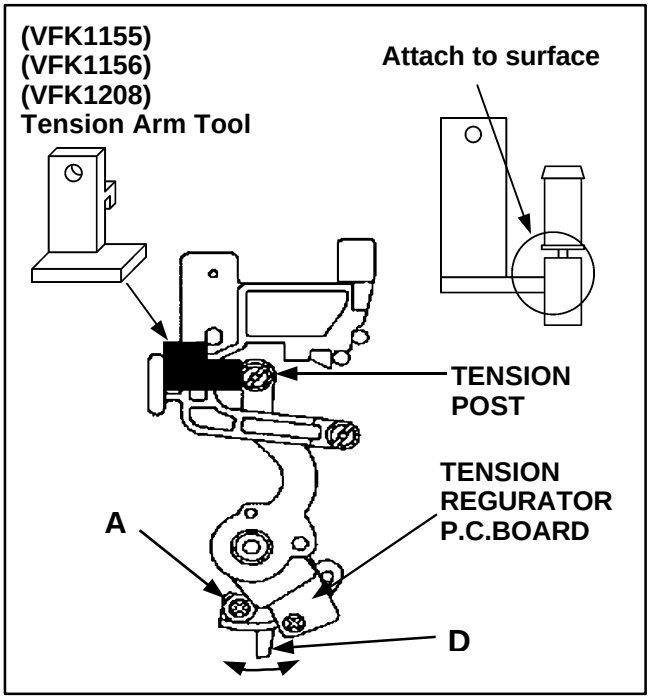


Figure 3-4-2

3-5. Tension Arm PLAY and REV Voltage Adjustment and Confirmation

SPEC	PLAY : 3.8 V ± 0.05 V REV : 1.2 V ± 0.3 V
TEST POINT	Tension : Refer to item “2. Table of Test Point”
ADJ.	Tension Gain : Refer to item “2. Table of Test Point”
MODE	STOP
TOOL	Digital Volt Meter VFK1156 (Black: for PLAY position) VFK1155 (Silver: for REV position)

<In case of model except CAM CORDER>

1. Unscrew the 2 screws and remove the Carriage Support Panel on the Front Loading Unit.
2. Disconnect the connector P3 on the Carriage Board of the Front Loading Unit.
3. Unscrew the 6 screws and remove the Top Plate on the Front Loading Unit as shown in figure 3-4-1.

<In case of model CAM CORDER>

1. Remove the Cassette Up Unit.

< Common procedure >

1. Set VFK1156 (black) as position as shown in figure 3-4-2.
2. Place the unit into the no tape loading mode.
3. Confirm that the DC voltage at Test point is within specification (PLAY).
4. If it out of spec, adjust the Adjustment VR so that the DC voltage is within specification (PLAY).
5. Set VFK1156 (Silver) as position as shown in figure 3-4-2.
6. Place the unit into the no tape loading mode.
7. Confirm that the DC voltage at Test point is within specification.
8. If it out of spec, perform the Tension Arm Position Adjustment again.

3-6. Tension Regulator Spring Adjustment

SPEC	108 mN-m (11gf)
TEST POINT	Tension : Refer to item “2. Table of Test Point”
ADJ.	Tension Regulator Spring hook (B)
MODE	STOP
TOOL	VFK1188 (Dial Tension Gauge) Digital Volt Meter

<In case of model except CAM CORDER>

1. Unscrew the 2 screws and remove the Carriage Support Panel on the Front Loading Unit.
2. Disconnect the connector P3 on the Carriage Board of the Front Loading Unit.
3. Unscrew the 6 screws and remove the Top Plate on the Front Loading Unit as shown in figure 3-4-1.

<In case of model CAM CORDER>

1. Remove the Cassette Up Unit.

< Common procedure >

1. Place the VTR into no tape loading mode.
2. Insert the tension gauge to push the tension post to the direction R until the voltage at the Test Point is 3.8V (PLAY position).
3. Loosen the screw (C) and adjust the position of hook (B) so that the indication of gauge is within specification.

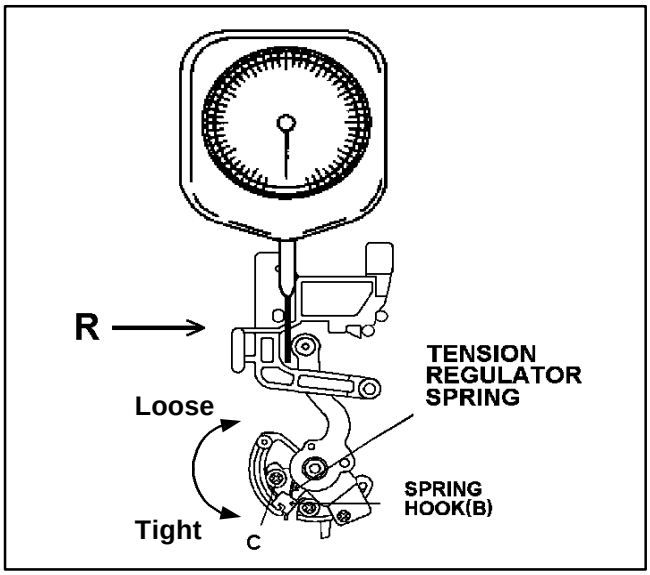


Figure 3-6

3-7. REV Tension Confirmation

SPEC	176mN ± 20mN (18gf ± 2gf)
TEST POINT	Tension : Refer to item "2. Table of Test Point"
MODE	STOP
TOOL	VFK1188 (Dial Tension Gauge) Digital Volt Meter

<In case of model except CAM CORDER>

1. Unscrew the 2 screws and remove the Carriage Support Panel on the Front Loading Unit.
2. Disconnect the connector P3 on the Carriage Board of the Front Loading Unit.
3. Unscrew the 6 screws and remove the Top Plate on the Front Loading Unit as shown in figure 3-4-1.

<In case of model CAM CORDER>

1. Remove the Cassette Up Unit.

<Common Procedure>

1. Place the VTR into no tape loading mode.
2. Insert the tension gauge to push the tension post to the direction R until the voltage at the Test Point is 1.2V (REV position).
3. Confirm that the indication of gauge is within specification. If not, make the Tension Spring Adjustment again.
4. After finish this adjustment, grew the screw A, B and C. The grew quantity at B is half of A and C.

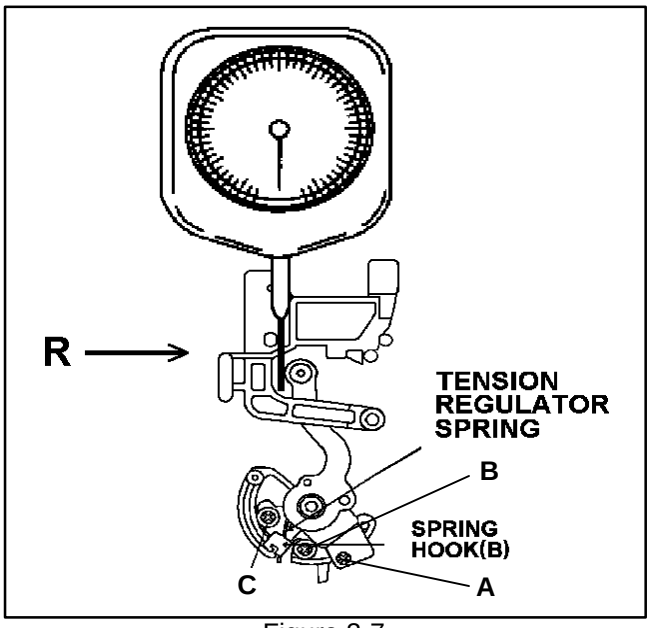


Figure 3-7

3-8. Tension Confirmation

SPEC	PLAY : 59mN ± 10mN (6gf ± 1gf) REV : 88mN ± 20mN (9gf ± 2gf)
MODE	PLAY, REV ×1
TAPE	63 min M size blank tape 123min. L size blank tape (AJ-D200, AJ-D210, AJ-D215)
TOOL	VFK1145 (Tension Meter)

♦ Please confirm that the calibration of Tension Meter before measurement of tension value follow below procedure.

<Calibration of Tension Meter>

1. Connect the 7 grams calibration weight to DVCPRO tape. (It tape and weight are included to VFK1145.)
2. Set the above tape to the Tension Meter as shown in figure 3-8-1.
3. Pull up the tape as speed 33mm/sec and adjust the Tension Meter so that the meter shows 7 grams.

♦ With tape pass direction should be the same direction of tape transportation under the VTR, when confirm the Tension Meter as shown in figure 3-8-1.

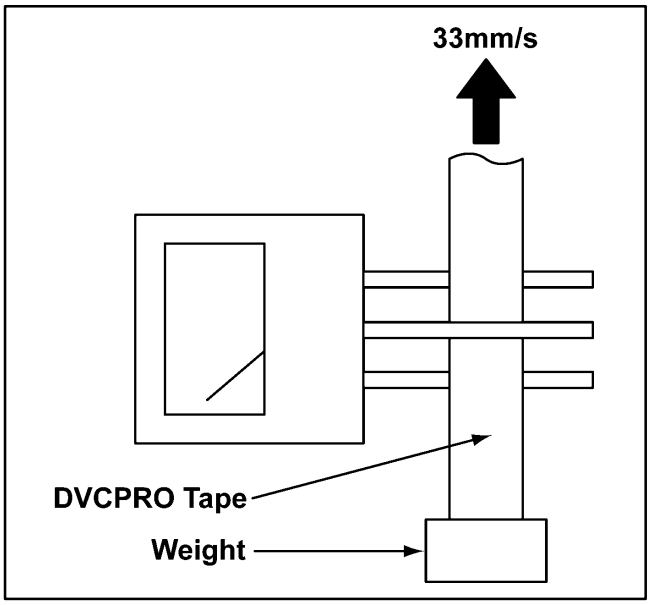


Figure 3-8-1

1. Play back beginning portion of the tape.
2. Insert the tension meter to between S3 post and S4 post as shown in figure 3-8-2.
3. Confirm that the tension value is within specification.

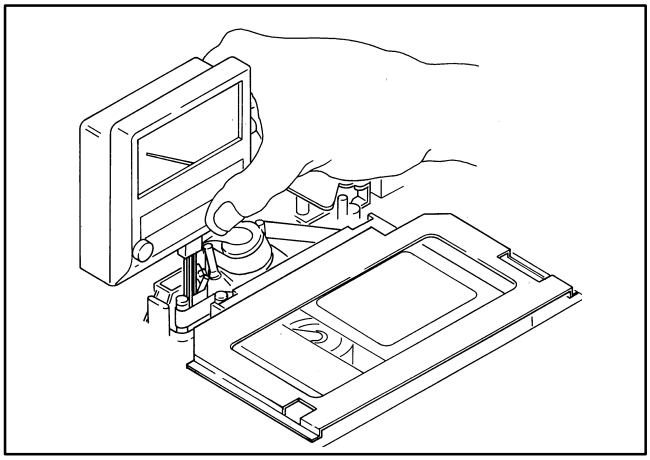


Figure 3-8-2

4. Place the unit in REV mode.
5. Insert the tension meter to between S4 post and S5 post as shown in figure 3-8-3.
6. Confirm that the tension value is within specification. (Read the meter display from rear side as shown in figure 3-8-3.)
7. If it out of specification, please perform the Tension Arm Adjustment.

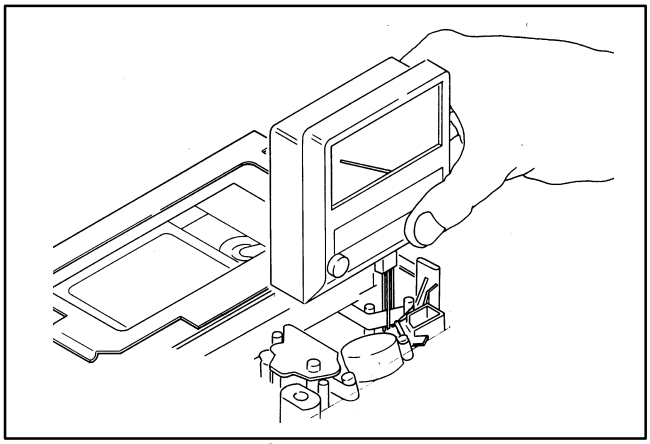


Figure 3-8-3

NOTE :

Be careful not to give some tape damage.

3-9. Photo Sensor Voltage Adjustment

SPEC	See below
TEST POINT	Refer to item “2. Table of Test Point”
ADJ.	Refer to item “2. Table of Test Point”
MODE	STOP
TAPE	VFK1423 (Tape Beg./End M Cassette) VFK1369 (Tape Beg./End L Cassette)
M. EQ	Oscilloscope

(Specification)

TYPE	Specification of voltage
A	A = 3.1 VDC ± 4.2 VDC
B	A = 3.2 VDC ± 0.8 VDC
C	A = 2.2 VDC ± 0.6 VDC

(Classified list of specification)

TYPE	Model
A	AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D750, AJ-D780, AJ-D850, AJ-D940, AJ-D950, AJ-D950A, AJ-DE77
B	AJ-D200, AJ-D210, AJ-D215, AJ-D610 AJ-D810, AJ-D90, AJ-D900W AJ-D900WA, AJ-PD900W
C	AJ-D220, AJ-D230, AJ-D230H, AJ-D250, AJ-D92, AJ-D94, AJ-D95DC, AJ-LT75 AJ-LT85

1. Insert the VFK1423 or VFK1369 (in case of AJ-D200, AJ-D210 and AJ-D215) and measure the voltage at Test Point.
2. Adjust the adjustment VR or Dip SW so that the A portion of DC voltage is within the specification as shown in figure 3-9-1.

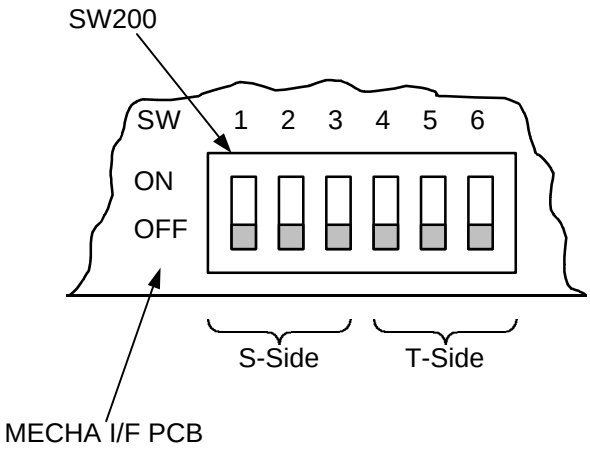
Figure 3-9-1

NOTE 1 :

If the model apply to TYPE A, please confirm that the value of resistor R11 and R12 are 8200 ohm on SYSCON (F2) P.C.Board before perform this adjustment.

NOTE 2 :

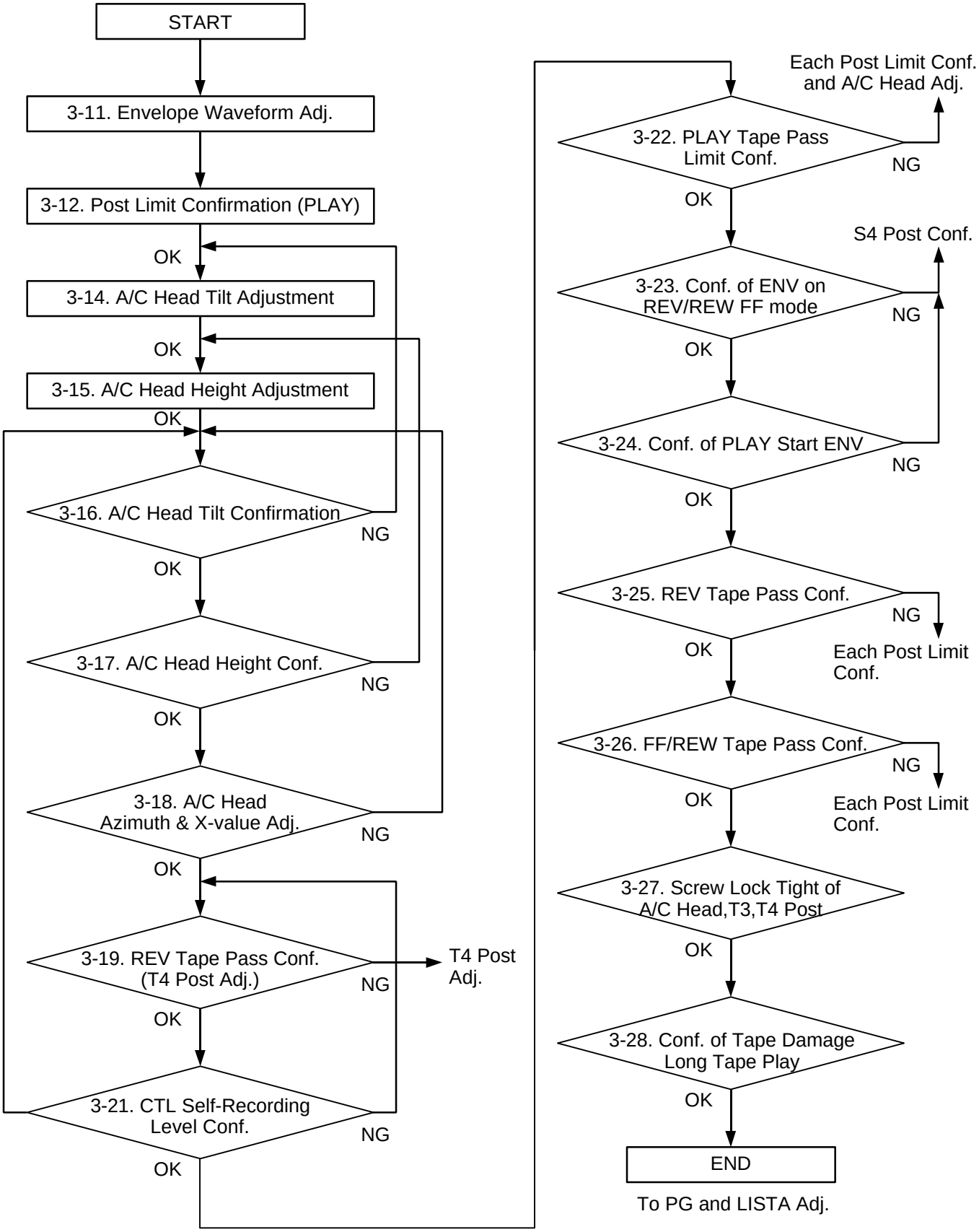
Photo sensor voltage is adjusted by Dip SW200 about Type A models. How set the bit of Dip SW for adjustment indicated as below figure 3-9-2.



SW1 SW2 SW3 / SW4 SW5 SW6	S-PHOTO / T-PHOTO	Synthetic Resistance
ON ON ON	A Voltage	420 ohm
OFF ON ON	UP	460 ohm
ON OFF ON	↑	660 ohm
OFF OFF ON	↑	750 ohm
ON ON OFF	↑	880 ohm
OFF ON OFF	↑	1050 ohm
ON OFF OFF	A Voltage	3300 ohm
OFF OFF OFF	DOWN	8200 ohm

Figure 3-9-2

3-10. Tape Pass Adjustment Procedure



3-11. Envelope Waveform Adjustment

SPEC	V1/Vmax, V2/Vmax, V3/Vmax ≥ 0.8	
TEST POINT	Refer to Table 3-11-2 and item "2. Table of Test Point"	
ADJ.	S1, T1 Post Height	
MODE	PLAY (ATF)	
TAPE	**NTSC** : VFM3580KM or VFM3580KL **PAL** : VFM3680KM or VFM3680KL	
M.EQ	Oscilloscope	
TOOL	**TYPE**	
	Except **F**	VFK1149 (Post Driver)
	F	VFK1149 (Post Driver) VFK1185 (BER COUNTER) VFK1158A (BER COUNTER CABLE)

(Classified list for ENV adjustment)

TYPE	Model
A	AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D750, AJ-D850
B	AJ-D200, AJ-D210, AJ-D215, AJ-D400, AJ-D700, AJ-D700A, AJ-D800, AJ-D800A, AJ-D810, AJ-D810A, AJ-D610
C	AJ-D220, AJ-D230, AJ-D230H, AJ-D250, AJ-LT75, AJ-LT85
D	AJ-DE77, AJ-D780
E	AJ-D950, AJ-D950A
F	AJ-D90, AJ-D900W, AJ-D900WA, AJ-D910WA, AJ-PD900W, AJ-PD900WA
G	AJ-D92, AJ-D94, AJ-D95DC
H	AJ-D940

Table 3-11-1

[Connection to BER COUNTER]

When confirm the RF envelope signal with model of TYPE F, it required the BER COUNTER is connected to CAM CORDER as shown in figure 3-11-1.

< In case of confirm the ENV Lch >

Connect the BER COUNTER CABLE to P4 connector on RF P.C.Board.

< In case of confirm the ENV Rch >

Connect the BER COUNTER CABLE to P5 connector on RF P.C.Board.

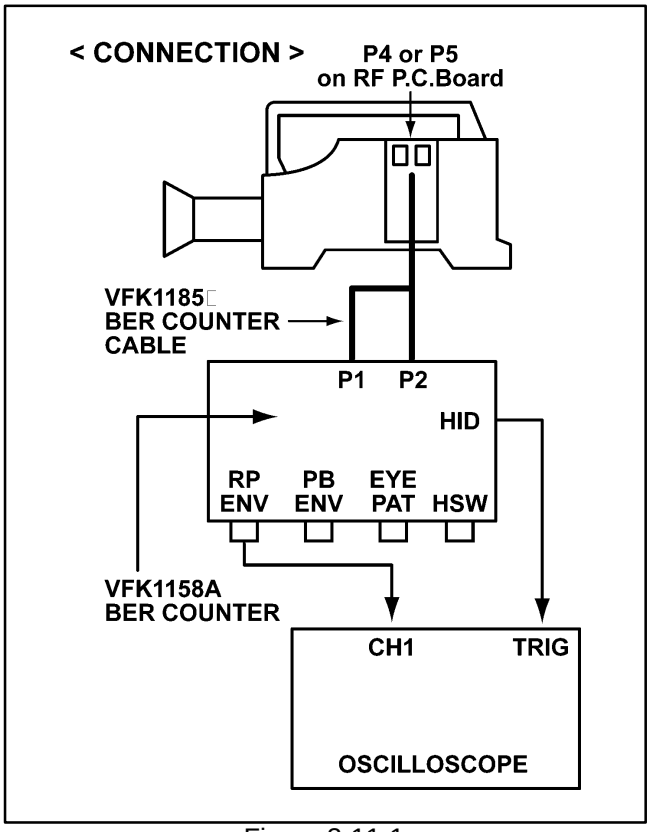


Figure 3-11-1

(Table of connected signal)

TYPE	Connected signal	TEST POINT
A, B, C	RP ENV	Refer to (Table of Test Point)
	RP HSW (TRIG)	
D	ENV L13	
	HSW L13 (TRIG)	
E	RP ENV L	
	RP ENV R	
	RP HSW L (TRIG)	
F, G	R/P ENV L	
	R/P ENV R	
	R/P HSW L (TRIG)	
	R/P HSW R (TRIG)	
H	PB ENV L13	
	PB ENV R13	
	PB HSW L13 (TRIG)	
	PB HSW R13 (TRIG)	

Table 3-11-2

[Adjustment Procedure]

1. If case of model of TYPE E, F, G and H, adjust both channels envelope by connect the test point alternately Lch and Rch.
2. In case of AJ-D940, open the SERVO ADJUST MENU on Service Menu and select the item “A14 : END SEL 25M”. (this item should be set to PBL13.)
3. Playback the alignment tape.
4. Adjust S1 and T1 post height so that the envelope signal is within the specification.
5. When the S1 and T1 posts are adjusted, first raise the post height and make small the entrance and exit side of the envelope, then down the post until envelope becomes flat.
6. With order to adjustment, basically adjust T1 post for makes flat at exit side of envelope first and adjust S1 post.
7. After finish this adjustment, unload the tape and load the tape again, then confirm the shape of Envelope waveform does not changed.

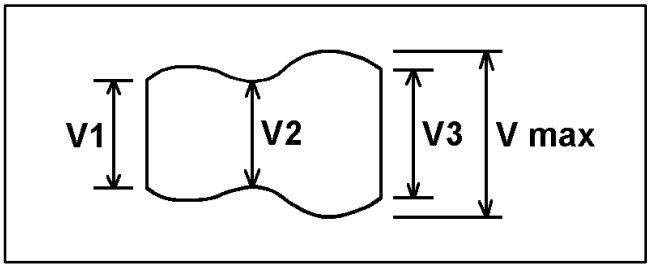


Figure 3-11-2

3-12. Post Limit Confirmation (PLAY)

SPEC	Post limit shown in the table curl does not appear on tape edge
MODE	PLAY
TAPE	Blank tape
TOOL	VFK1149 (Post Driver) VFK1151 (Nut Driver)

1. Confirm that the tape pass limit follow the as shown as below table and adjust it in case of need.
2. Confirm that the kinds of D, E and F condition do not appeared on the tape as shown in figure.

Post	Limit	Adjustment
S5	Lower limit or Free	S5 Post Height
S4	Lower Limit	S4 Post Height
S1	Upper Limit	Envelope waveform
T1	Upper Limit	Envelope waveform
T3	Lower Limit	T3 Post Height
T4	Lower limit or Free	T4 Post Height

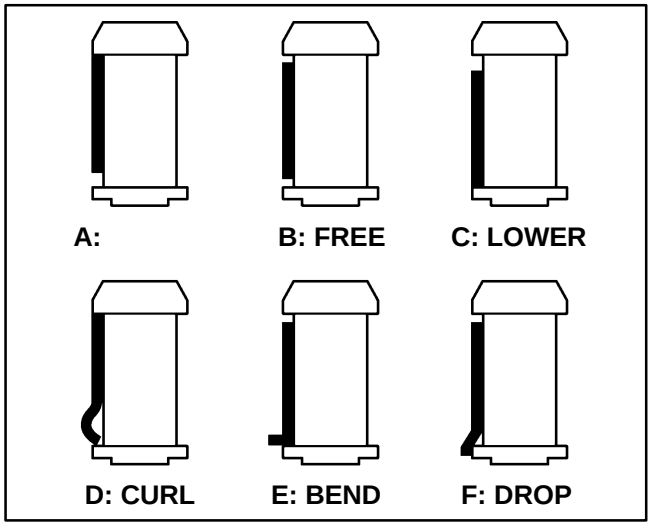


Figure 3-12

3-13. A/C Head Adjustment Method (General)

Adjustment item	SCREW	Adjustment Method	Torque
Tilt adjustment	A	① Adjust screw A after loosen screw G. Tighten direction : Decrease Cue level Loosen direction : Increase Cue level ② Tighten screw G after finish adjustment screw A. (refer to below item “Azimuth adjustment fixed screw”)	
Height adjustment	B	Tighten direction : In case of increase CTL, when A/C Head Press down. Loosen direction : In case of increase CTL, when A/C Head lift up **NOTE 1 :** Please refer to figure 3-13-3 with portion at lift up and press down to A/C Head.	
Azimuth adjustment	F	① Phase is adjusted by screw F after loosen screw G ② Tighten screw G after finish adjustment screw F. (refer to below item “Azimuth adjustment fixed screw”)	
X-value adjustment	C, D	① Adjust X-value by VFK0357 at Hole (E), then tighten the screw (C) and (D) to fix A/C Head horizontal position. ② Hit a portion at A/C Head Top Plate as shown in figure 3-13-4 for confirm the phase is shift.	24.5cN-m (2.5Kg-cm)
Azimuth adjustment fixed screw	G	Screw (G) is always tighten during adjustment except Tilt and Azimuth Adjustment.	19.5cN-m (1.0Kg-cm)
Fixed height	H	After height adjustment, tighten the screw (H) to fix height of A/C Head. Normally the CUE level is decrease, when the screw (H) is tighten. In this case, tighten the screw (H) at the position of turn angle 10 to 15 degree counter clockwise from the position at adjustment finished for keep the maximum level.	

SCREW	Tool for adjustment
A	VFK1178 (0.89mm Hex Driver)
B	VFK1150 (5.5mm Nut Driver)
F	VFK1148 (1.5mm Hex Driver)
C, D, G	VFK1209 (Torque Driver), VFK1148 (1.5mm Hex Driver) VFK1375 (1.5mm Post Axis Driver)
H	VFK1190 (1.5mm L type of Hex Wrench)

1. With Tilt and Azimuth adjustment, loosen screw (G) first and tighten screw (G) after finish adjustment. And if turn screw (A) and (F) too much for adjustment, tighten screw (A), (F) and (G) alternately.

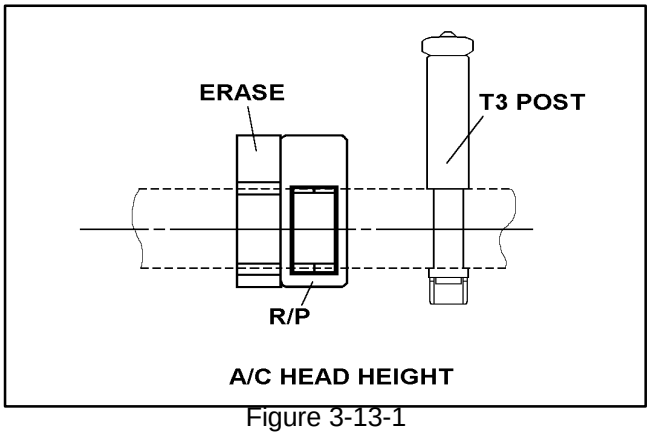


Figure 3-13-1

2. Perform the Height and X-value adjustment under the screw (G) tighten completely.
3. Be careful the tape damage at T3 Post, when adjust tilt of A/C Head. (refer to figure 3-13-1)

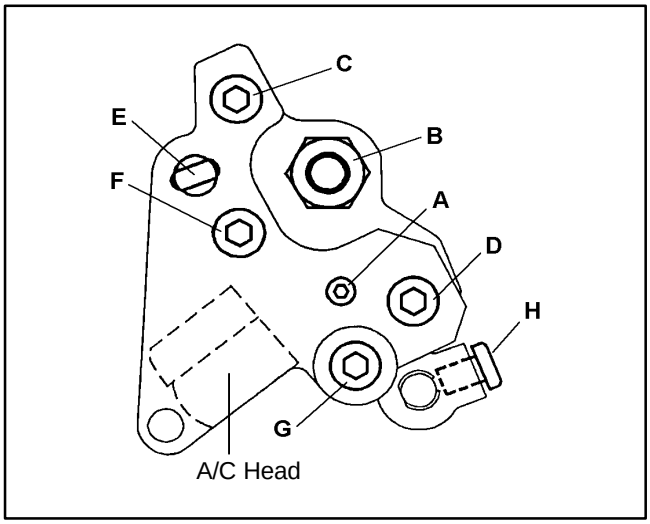


Figure 3-13-2

4. Confirm the screw (A) does not loosen, before execute the A/C Head Tilt adjustment. The screw (A) should be always touch to top of A/C Head.
5. When the height of A/C Head is adjusted by Nut (B), first the screw (H) should be loosen. And after height adjustment finished, tighten the screw (H) lightly.

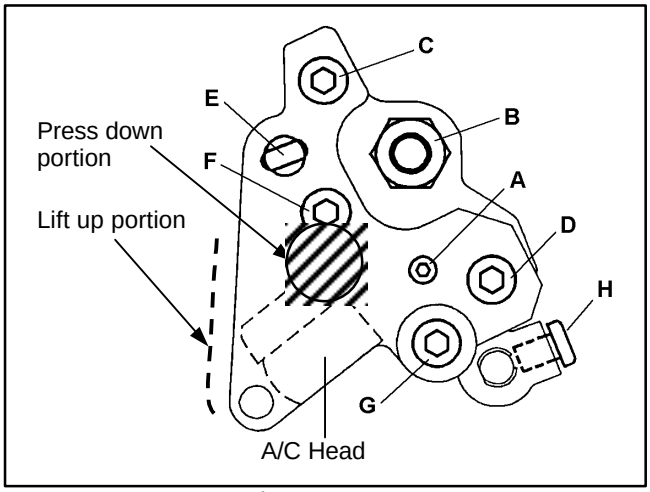


Figure 3-13-3

6. After finish X value adjustment, hit the portion (L) lightly and confirm the specification of X-value.
7. Each adjustment of A/C Head should be finished at the condition of turn the each adjustment screw tighten direction. And hit the portion (L) lightly for remove the distortion of A/C Head plate.

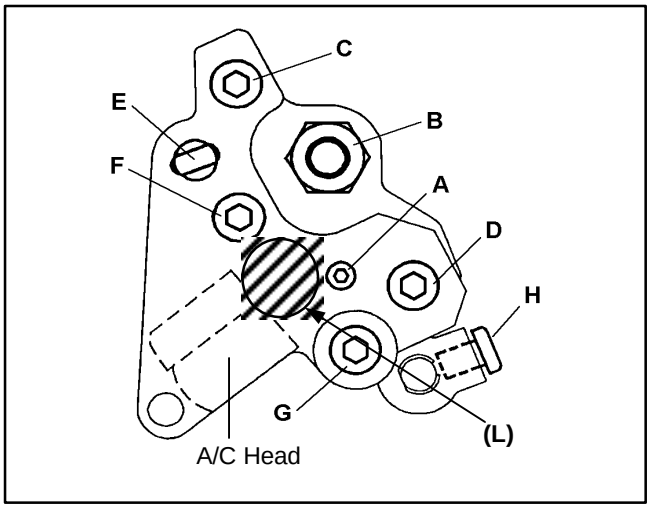


Figure 3-13-4

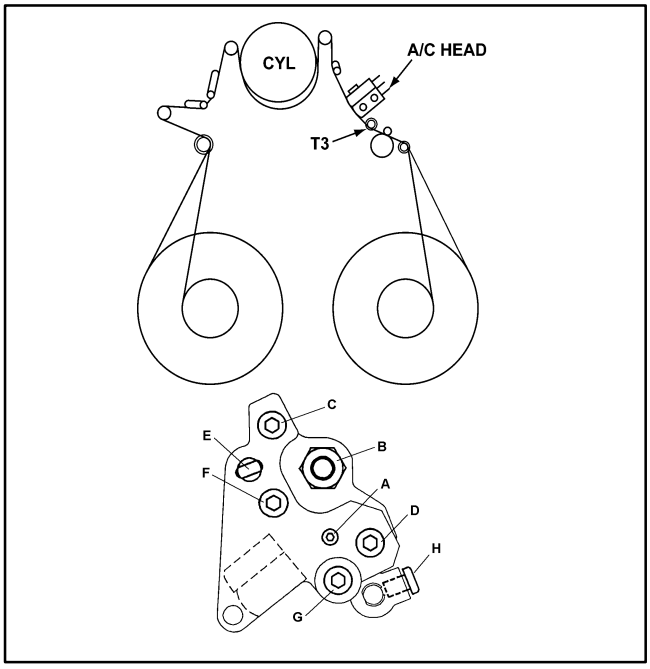
3-14. A/C Head Tilt Adjustment

SPEC	curl does not appear on tape edge Lower limit at T3 post
ADJ.	SCREW A, G (A/C Head)
MODE	PLAY
TAPE	Blank tape (The long time correspond model use long time recorded tape)
TOOL	VFK1148, VFK1178 (Hex Driver)

1. Play back the tape and adjust screw (A) for adjustment of tilt of A/C Head so that the tape path has lower limit without curl at T3 post.
2. To adjustment, loosen the screw (G) and make curl on tape at lower flange of T3 post by screw (A). And tighten screw (A) accordingly for find the point of curl disappeared. After finish adjustment for screw (A), tighten the screw (G) is tightened with 10cN-m (1.0Kg/cm) of torque.

NOTE :

1. In case of turn clockwise screw (A).
   → Tape goes up at T3 post.
   In case of turn counter-clockwise screw (A).
   → Tape goes down at T3 post.
2. When screw adjustment finished, with each adjustment screw on A/C Head should be finished tighten direction. And confirm that the screw does not loosen.
3. Adjust and confirmation should be performed alternately with each A/C head adjustment (Azimuth and Height).



3-15. A/C Head Height Adjustment

SPEC	See below
TEST POINT	CUE AUDIO : CTL: Refer to item “2. Table of Test Point”
ADJ.	SCREW B, H (A/C Head)
MODE	See below
TAPE	**NTSC :** VFM3580KM or VFM3580KL (14 to 22min) **PAL :** VFM3680KM or VFM3680KL (14 to 22min)
TOOL	VFK1150 (Nut Driver) VFK1190 (Hex Wrench)

(Classified list for height)

TYPE	Model
A	AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D750, AJ-D850
B	AJ-D200, AJ-D210, AJ-D215, AJ-D400, AJ-D700, AJ-D700A, AJ-D800, AJ-D800A, AJ-D810, AJ-D810A, AJ-D610
C	AJ-D220, AJ-D230, AJ-D230H, AJ-D250, AJ-LT75, AJ-LT85
D	AJ-DE77, AJ-D780
E	AJ-D940, AJ-D950, AJ-D950A
F	AJ-D90, AJ-D900W, AJ-D900WA, AJ-D910WA, AJ-PD900W, AJ-PD900WA
G	AJ-D92, AJ-D94, AJ-D95DC

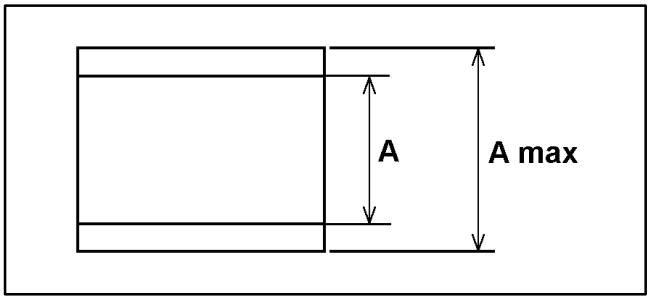
(Classified list of specification)

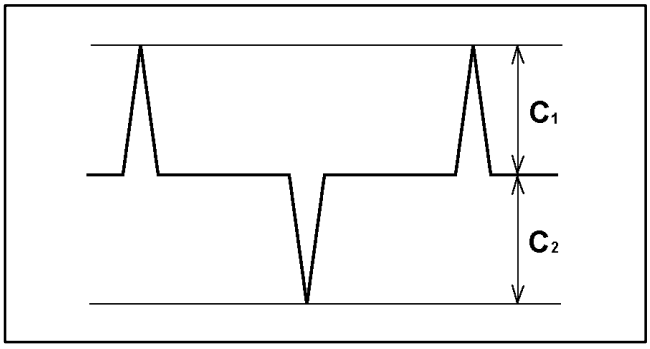
TYPE	Spec. for CUE	Spec. for CTL
A, D, E	A = Amax	C1, C2 ≥ 1.8 V
B, F		C1, C2 ≥ 220 mV
C, G		C1, C2 ≥ 160 mV

(VTR mode)

TYPE	VTR mode
A, B, C	PLAY
D	FWD X1.0 (SHTL)
E, F, G	25M mode PLAY

1. Press and Lift up to A/C Head lightly as indicated as figure position, then confirm that the CTL and CUE output level is within specification.
2. If it out of spec., loosen the screw H and adjust the screw B until Cue output is maximized.
3. When confirm the level in specification, screw (H) should be tighten completely. (refer to A/C Head Adjustment Method)
4. Adjust alternately with other A/C head adjustments (Azimuth, X-Value).

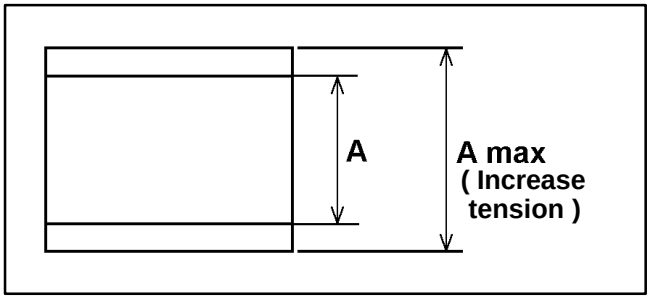


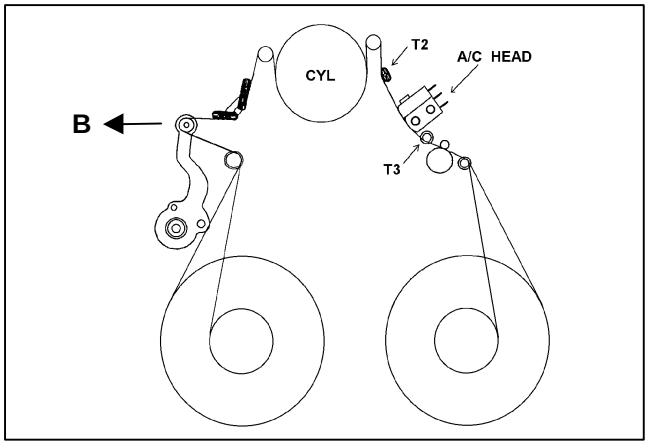


3-16. A/C Head Tilt Confirmation

SPEC	A/Amax ≥ 0.8
TEST POINT	CUE AUDIO : Refer to item “2. Table of Test Point”
ADJ.	SCREW A, G (A/C Head)
MODE	PLAY
TAPE	**NTSC :** VFM3580KM or VFM3580KL (14 to 22min) **PAL :** VFM3680KM or VFM3680KL (14 to 22min)
TOOL	VFK1178, VFK1148 (Hex Driver)

1. Playback the Alignment tape.
2. Confirm that the screw G and H are not loosened.
3. Push the tension post follow the arrow (B) direction as shown in figure as range of T2 post does not move. And confirm that the CUE output level is within specification.
4. If out of specification, loosen the screw G and adjust the screw A, then tighten the screw G with 10cN-m (1.0kg) torque.
5. The final touch of the adjustment must be turned clockwise. After this adjustment, confirm that the screw A is not loosened.
6. If adjust the screw A, Confirm that the tape pass condition follow Post Limit Confirmation procedure (item 3-12).





3-17. A/C Head Height Confirmation

SPEC	See below
TEST POINT	CUE AUDIO : CTL: Refer to item “2. Table of Test Point”
ADJ.	SCREW B, H (A/C Head)
MODE	See below
TAPE	**NTSC :** VFM3580KM or VFM3580KL (14 to 22min) **PAL :** VFM3680KM or VFM3680KL (14 to 22min)
TOOL	VFK1150 (Nut Driver) VFK1190 (Hex Wrench)

(Classified list for height)

TYPE	Model
A	AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D750, AJ-D850
B	AJ-D200, AJ-D210, AJ-D215, AJ-D400, AJ-D700, AJ-D700A, AJ-D800, AJ-D800A, AJ-D810, AJ-D810A, AJ-D610
C	AJ-D220, AJ-D230, AJ-D230H, AJ-D250, AJ-LT75, AJ-LT85
D	AJ-DE77, AJ-D780
E	AJ-D940, AJ-D950, AJ-D950A
F	AJ-D90, AJ-D900W, AJ-D900WA, AJ-D910WA, AJ-PD900W, AJ-PD900WA
G	AJ-D92, AJ-D94, AJ-D95DC

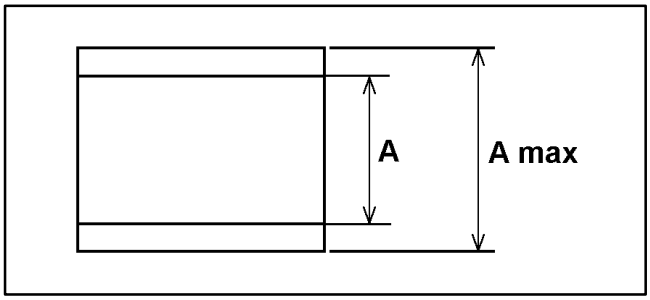
(Classified list of specification)

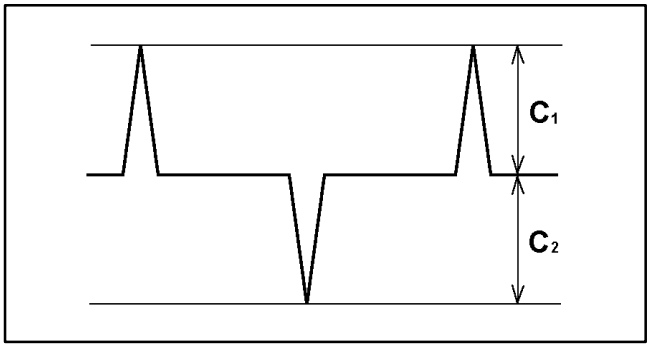
TYPE	Spec. for CUE	Spec. for CTL
A, D, F	A = 0.95 × Amax	C1, C2 ≤ 1.8 V
B, F		C1, C2 ≥ 220 mV
C, G		C1, C2 ≥ 160 mV

(VTR mode)

TYPE	VTR mode
A, B, C	PLAY
D	FWD X1.0 (SHTL)
E, F, G	25M mode PLAY

1. Press and Lift up to A/C Head lightly as indicated as figure position, then confirm that the CTL and CUE output level is within specification.
2. If it out of spec., loosen the screw H and adjust the screw B until Cue output is maximized. (refer to item “3-15 A/C Head Height Adjustment”.)





3-18. A/C Head Azimuth and X-value Adjustment (25M)

SPEC	As shown in below figure. -250µs ≤ t1, t2 ≤ +250µs	**TEST POINT**	RP ENV PB HSW CUE CTL	Refer to item "2. Table of Test Point.
ADJ.	A/C Head each screw	**M.EQ**	Oscilloscope	
MODE	See below	**TOOL**	VFK0357 (Eccentric Driver) VFK1148 (Hex Driver) VFK1209 (Torque Driver) VFK1375 (Hex Bit)	
TAPE	**NTSC :** VFM3582KM or VFM3582KL **PAL :** VFM3682KM or VFM3682KL			

(Classified list)

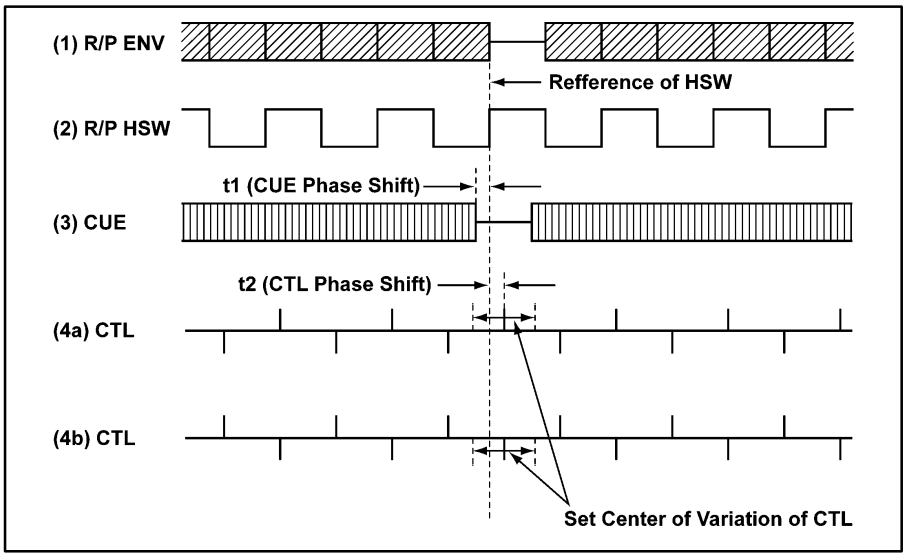
TYPE	Model
A	AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D750, AJ-D850
B	AJ-D200, AJ-D210, AJ-D215, AJ-D400, AJ-D700, AJ-D800, AJ-D810, AJ-D610
C	AJ-D220, AJ-D230, AJ-D230H, AJ-D250, AJ-LT75, AJ-LT85

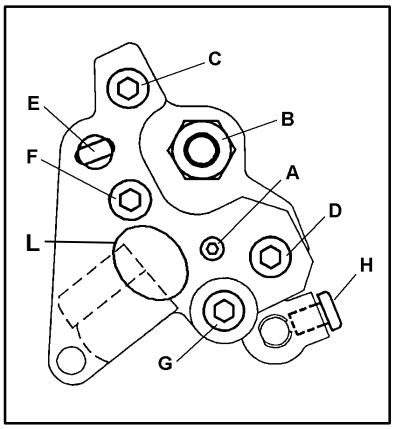
(CTL Reference)

TYPE	Reference (Trigger)
A	Falling edge: refer to below figure (4b).
B, C	Rising edge: refer to below figure (4a).

(VTR mode)

TYPE	Mode
A, C	ATF PLAY mode by RP Head. (refer to [A/C Head Adjustment mode] on item "2. Table of Test Point".)
D	PLAY





1. Set the VTR mode on Service Menu with type A and C models.
2. Playback an X-value Alignment tape.
3. Adjust screw (F) so that the CTL and Lack part of CUE (t2) is match in the phase. (refer to A/C Head Adjustment Procedure)
4. Confirm the lack track of envelope, and select the HSW correspond with it (The lack track is correspond HSW high with L ch).
5. Adjust A/C Head Horizontal position so that the reference of HSW and CTL trigger are match in the phase (t1). To adjust X-value, loosen the screw C and D, adjust the hole E by VFK0357. After adjustment tighten the screw C and D with 24.5cN-m (2.5Kg) torque. At this time adjust the phase simultaneously with Azimuth so that the CTL and CUE phase is kept.
6. Hit the top plate (portion L as shown in figure) of A/C Head lightly by a pointed end of Eccentric driver , then confirm the phase is not shifted finally.

3-18. A/C Head Azimuth and X-value Adjustment (50M)

SPEC	As shown in below figure. 25M mode : -250µs ≤ t1, t2 ≤ +250µs 50M mode : -125µs ≤ t1, t2 ≤ +125µs	**TEST POINT**	R/P ENV L R/P HSW L CUE OUT CTL OUT	Refer to item "2. Table of Test Point.
ADJ.	A/C Head each screw	**M. EQ**	Oscilloscope	
MODE	See below	**TOOL**	VFK0357 (Eccentric Driver) VFK1148 (Hex Driver) VFK1209 (Torque Driver) VFK1375 (Hex Bit)	
TAPE	**NTSC :** VFM3582KM or VFM3582KL **PAL :** VFM3682KM or VFM3682KL			

(Classified list)

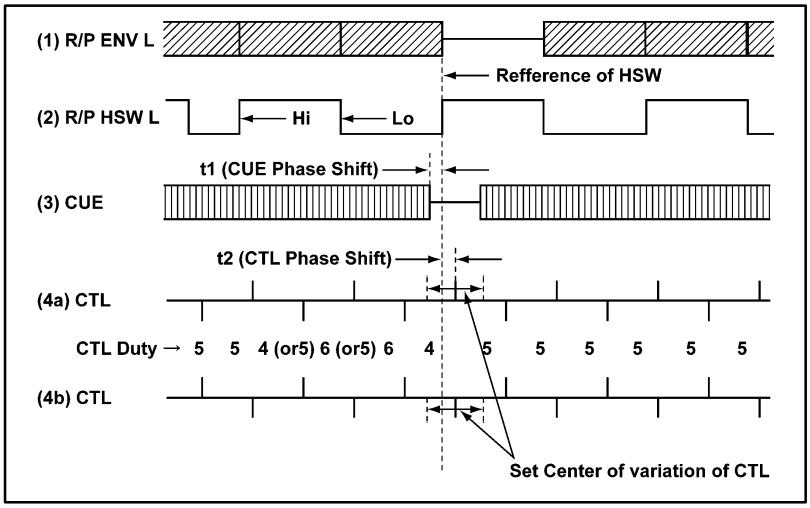
TYPE	MODEL
A	AJ-D950, AJ-D950A
B	AJ-D90, AJ-D900W, AJ-D910WA, AJ-PD900W
C	AJ-D92, AJ-D94, AJ-D95DC

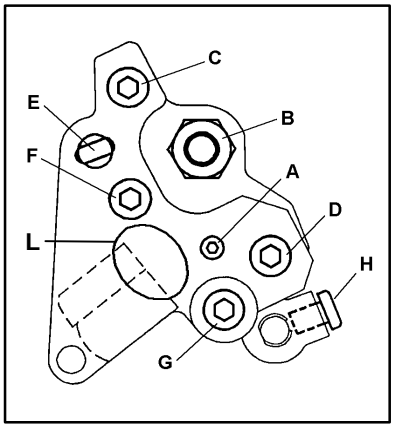
(CTL Reference)

TYPE	Reference (Trigger)
B, C	Rising edge : refer to below figure 1 (4a).
A	Falling edge : refer to below figure 1 (4b).

(VTR mode)

TYPE	Mode
A, C	25M/50M : ATF PLAY mode by RP Head. (refer to Head Adjustment mode] on "Table of Test Point".)
B	25M : 25M PLAY, 50M : 50M PLAY

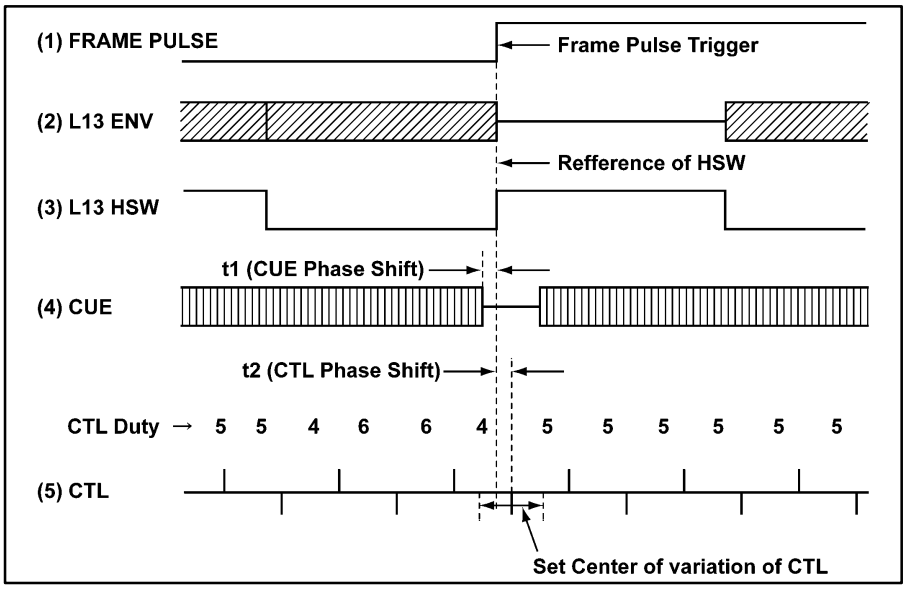


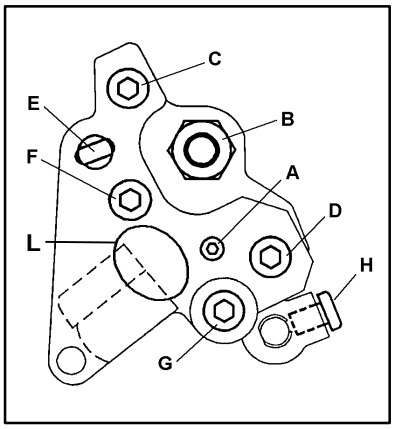


1. Set the VTR mode on Service Menu with type A and C models.
2. Set the VTR in 25M mode and playback an X-value Alignment tape.
3. Adjust screw (F) so that the CTL and Lack part of CUE (t2) is match in the phase. (refer to A/C Head Adjustment Procedure).
4. Confirm the lack track of envelope, and remember the HSW is high or low at the portion (H SW High or Low is changed at each tape loading).
5. Adjust A/C Head Horizontal position so that the memorized HSW and CTL trigger at the frame start is match in the phase (t1). The frame start CTL is located at the edge between 6 : 4 and 5 : 5 portion. To adjust A/C Head Horizontal position, loosen the screw C and D, adjust the hole E by VFK0357. After adjustment tighten the screw C and D with 24.5cN-m (2.5Kg) torque. At this time adjust the phase simultaneously with Azimuth so that the CTL and CUE phase is kept.
6. Hit the top plate (portion L as shown in figure) of A/C Head lightly by a pointed end of Eccentric driver, then confirm the phase is not shifted finally.
7. Set the VTR in 50M mode and confirm the timing is in specification. If it out spec., adjust this item again.

3-18. A/C Head Azimuth and Horizontal Position Adjustment (AJ-D780 & AJ-DE77)

SPEC	As shown in below figure -250μs ≤ t1, t2 ≤ +250μs	**TEST POINT**	FLAME PULSE L13 ENV L13 HSW CUE OUT CTL OUT	Refer to item "2. Table Of Test Point"
ADJ.	A/C Head each screw	**M. EQ**	Oscilloscope	
MODE	PLAY (Frame synchronized mode)	**TOOL**	VFK0357 (Eccentric Driver) VFK1148 (Hex Driver) VFK1209 (Torque Driver) VFK1375 (Hex Bit)	
TAPE	**NTSC :** VFM3582KM or VFM3582KL **PAL :** VFM3682KM or VFM3682KL			
CTL Reference	Falling edge			





1. Confirm that the phase of CUE and CTL are within specification against Frame pulse trigger. If it out of spec., perform adjustment follow the below procedure.
2. Adjust screw (F) so that the CTL and Lack part of CUE (t2) is match in the phase. (refer to A/C Head Adjustment Procedure).
3. Confirm the lack track of envelope, and select the HSW correspond with it (The lack track is correspond HSW high with L ch).
4. Adjust A/C Head Horizontal position so that the memorized HSW and CTL trigger at the frame start is match in the phase (t1). The frame start CTL is located at the edge between 6 : 4 and 5 : 5 portion. To adjust A/C Head Horizontal position, loosen the screw C and D, adjust the hole E by VFK0357. After adjustment tighten the screw C and D with 24.5cN-m (2.5Kg) torque. At this time adjust the phase simultaneously with Azimuth so that the CTL and CUE phase is kept.
5. Hit the top plate (portion L as shown in figure) of A/C Head lightly by a pointed end of Eccentric driver, then confirm the phase is not shifted finally.

NOTE : If the waveform could not be stabilized by trigger (HSW or CTL) on the scope, please use the TP105 (CF PULSE) on the SERVO (in case of AJ-D780) or V OUT (in case of AJ-DE77) P.C.Board.

6. After finish this X-value adjustment, EVR adjustment is required follow the below procedure.

<In case of AJ-D780>

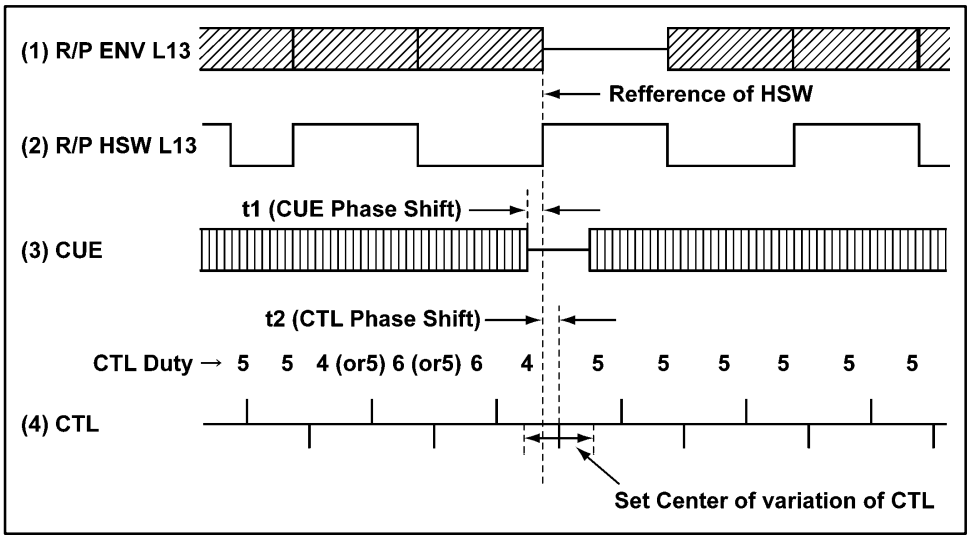
1. Select item "A06 : X VALUE" on Service menu.
2. Playback the X-value alignment tape.
3. Press cursor button "→" or "←" and keep it until numerical value is renewed.
4. Confirm that the value is 0 ± 55.
5. If out of specification, perform the X-value adjustment again.

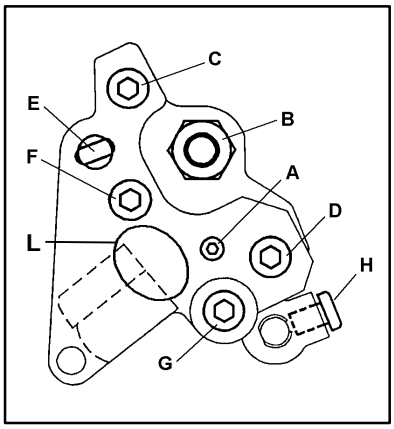
<In case of AJ-DE77>

1. Select item "A09 : X VALUE" on Service menu.
2. Playback the X-value alignment tape.
3. Press "SERACH" button and keep it until numerical value is renewed.
4. Confirm that the value is 0 ± 55.
5. If out of specification, perform the X-value adjustment again.

3-18. A/C Head Azimuth and Horizontal Position Adjustment (AJ-D940)

SPEC	As shown in below figure 50M : -125μs ≤ t1, t2 ≤ +125μs	**TEST POINT**	PB ENV L13 PB HSW L13 CUE OUT CTL OUT	Refer to item "2. Table Point
MODE	ATF mode PLAY on PB L13ch Head Format : 50M Select item "A05:PBL13 LINEAR" on Service	**TOOL**	VFK0357 (Eccentric Driver) VFK1148 (Hex Driver) VFK1209 (Torque Driver) VFK1375 (Hex Bit)	
TAPE	**NTSC :** VFM3582KM or VFM3582KL **PAL :** VFM3682KM or VFM3682KL	**M. EQ**	Oscilloscope	





1. Open the SERVO ADJUST MENU on Service Menu and select the item "A05 : PBL13 LINEAR".
2. Playback a X-value alignment tape on 50M mode.
3. Adjust screw (F) so that the CTL and Lack part of CUE (t2) is match in the phase. (refer to A/C Head Adjustment Procedure).
4. Confirm the lack track of envelope, and remember the HSW is high or low at the portion (H SW High or Low is changed at each tape loading).
5. Adjust A/C Head Horizontal position so that the memorized HSW and CTL trigger at the frame start is match in the phase (t1). The frame start CTL is located at the edge between 6 : 4 and 5 : 5 portion. To adjust A/C Head Horizontal position, loosen the screw C and D, adjust the hole E by VFK0357. After adjustment tighten the screw C and D with 24.5cN-m (2.5Kg) torque. At this time adjust the phase simultaneously with Azimuth so that the CTL and CUE phase is kept.
6. Hit the top plate (portion L as shown in figure) of A/C Head lightly by a pointed end of Eccentric driver, then confirm the phase is not shifted finally.

3-19. REV Tape Pass Confirmation and Adjustment (T4 Post Height Adjustment)

SPEC	C1, C2 ≥ Cp1, Cp2×0.75 **NOTE:** C1, C2 : CTL output REV (-1) mode Cp1, Cp2 : CTL output PLAY (+1) mode Lower limit at T3 post on REV mode Curl does not appear on tape at T3 and T4 post
TEST POINT	CTL : refer to item "2. Table of Test Point
ADJ.	T4 post height
MODE	See below
TAPE	**NTSC:**VFM3580KM or VFM3580KL **PAL:**VFM3680KM or VFM3680KL
TOOL	VFK1150 (Nut Driver)

(Classified list of REV Tape Pass Confirmation)

TYPE	Model
A	AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D750, AJ-D850
B	AJ-D200, AJ-D210, AJ-D215, AJ-D400, AJ-D700, AJ-D700A, AJ-D800, AJ-D800A, AJ-D810, AJ-D810A, AJ-D610
C	AJ-D220, AJ-D230, AJ-D230H, AJ-D250, AJ-LT75, AJ-LT85
D	AJ-DE77, AJ-D780
E	AJ-D940, AJ-D950, AJ-D950A
F	AJ-D90, AJ-D900W, AJ-D900WA, AJ-D910WA, AJ-PD900W, AJ-PD900WA
G	AJ-D92, AJ-D94, AJ-D95DC

(VTR mode)

TYPE	Mode
[PLAY (+1)]	
A, B, C	PLAY
D	FWD +1.0 (SHTL) or PLAY
E, F, G	PLAY on 25M mode
[REV (-1)]	
A, B, C, D	REV -1.0 (SHTL)
E, F, G	FWD X1.0 (SHTL) on 25M mode

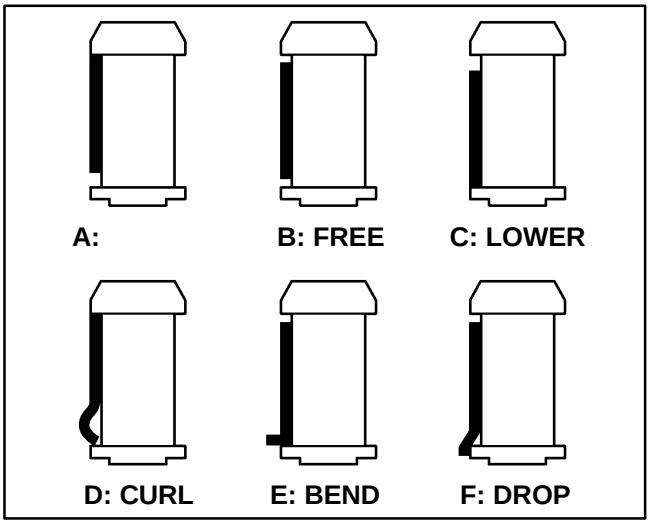
1. Place unit into REV mode, and confirm the post limit and CTL signal are in the specification. IF not, adjust T4 post follow the below procedure.
2. Turn the Nut of T4 post clockwise or counterclockwise follow the tape limit condition at T3 post. The maximum rotation angle is 45 degree.
3. Place unit into REV X1 mode and confirm the CTL output level is become more than 75% on play mode. Confirm the tape pass limit become lower limit at T3 post and the tape does not have curl at T3 and T4 post.
4. However out of specification, adjust T4 post height follow the item “Post Height Pre-adjustment procedure”.

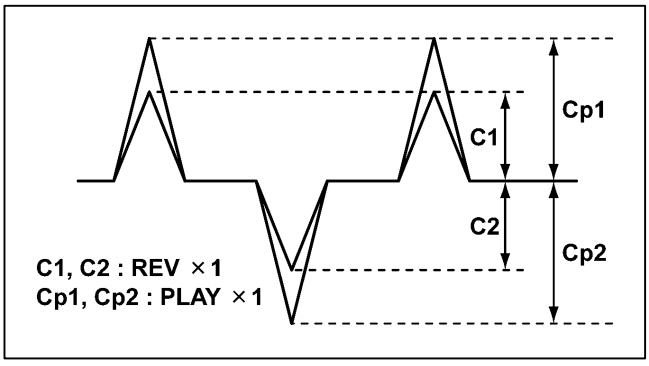
[T4 Nut Adjustment Direction]

Direction	CTL Level	Condition of lower limit on T3 Post
Tighten	Increase	Tape touch to strong
Loosen	Decrease	Tape touch to weak

[Post limit]

Post	A	B	C	D	E	F
T3	NG	NG	OK	NG	NG	NG
T4	OK	OK	OK	NG	NG	NG





3-20. REV (-1) Mode Setting Procedure

<Setting Procedure>

TYPE	How to Setting
A	Select the -1.0 speed by SEARCH Dial.
B	(1) Set the VTR to 25M Playback mode (2) Select the -1.0 speed by SEARCH Dial.
C	(1) Open the SERVICE MENU. (2) Press “PLAY” and ”REW” button simultaneously.
D	(1) Connect the front panel of AJ-D750 or Editing Controller. (2) Select the -1.0 speed by SEARCH Dial.
E	(1) Set the VTR to STILL mode by press “PLAY” button twice. (2) Press “PLAY” and ”RESET” button simultaneously.
F	(1) Open the SERVICE MENU. (3) Press “PLAY”, “STOP” and ”END” button simultaneously.
G	(1) Open the SERVICE MENU. (2) Press “PLAY” and ”REW” button simultaneously.

(Classified list of REV mode setting)

TYPE	Model
A	AJ-D440, AJ-D450, AJ-D750, AJ-D850, AJ-LT75, AJ-LT85
B	AJ-D940, AJ-D950, AJ-D950A
C	AJ-D640, AJ-D650, AJ-D780
D	AJ-DE77
E	AJ-D200, AJ-D210, AJ-D215, AJ-D400, AJ-D700, AJ-D700A, AJ-D800, AJ-D800A, AJ-D810, AJ-D810A, AJ-D90, AJ-D900W, AJ-D900WA, AJ-D910WA, AJ-PD900W, AJ-PD900WA, AJ-D610
F	AJ-D220, AJ-D230, AJ-D230H, AJ-D250
G	AJ-D92, AJ-D94, AJ-D95DC

NOTE : Above setting only apply to item “REV Tape Pass Confirmation and Adjustment (T4 post height adjustment)”. All models should be set to 25M mode with REV (-1) speed playback.

3-21. CTL Self Recording Level

Confirmation

TEST POINT	CTL : (refer to Table of Test Point)
ADJ.	T4 post height
MODE	PLAY, REV×1
TAPE	Blank Tape
M.EQ	Oscilloscope

(Classified list of CTL Recording Level)

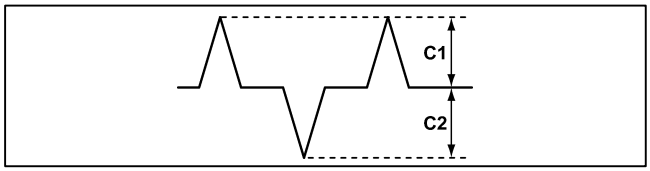
TYPE	Model
A	AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D750, AJ-D850
B	AJ-D200, AJ-D210, AJ-D215, AJ-D400, AJ-D700, AJ-D700A, AJ-D800, AJ-D800A, AJ-D810, AJ-D810A, AJ-D610
C	AJ-D220, AJ-D230, AJ-D230H, AJ-D250, AJ-LT75, AJ-LT85
D	AJ-DE77, AJ-D780
E	AJ-D940, AJ-D950, AJ-D950A
F	AJ-D90, AJ-D900W, AJ-D900WA, AJ-D910WA, AJ-PD900W, AJ-PD900WA
G	AJ-D92, AJ-D94, AJ-D95DC

(Specification for confirmation)

TYPE	CTL Output Level : C1, C2
PLAY (Please refer to Table 1)	
A, D, E	C1, C2 ≥ 1.8 V
B, F	C1, C2 ≥ 220 mV
C, G	C1, C2 ≥ 160 mV
REV (1) (-1 speed on SHTL mode)	
A, D, E	C1, C2 ≥ 1.4 V
B, F	C1, C2 ≥ 170 mV
C, G	C1, C2 ≥ 120 mV
REV (2) (-0.2 speed on SHTL mode)	
A, D, E	C1, C2 ≥ 1.2 V
B, F	----------
C, G	----------

< PLAY mode on VTR>

TYPE	Mode
A, B, C	PLAY
D	FWD +1.0 (SHTL) or PLAY
E, F, G	PLAY on 25M mode



1. Please confirm that the each screws are fixed on A/C Head.
2. Place Unit into REC mode and playback the recorded portion.
3. Confirm that the CTL level is within specification on PLAY and REV mode.
4. If CTL level is out of specification on PLAY mode, confirm the height of A/C Head (refer to item “A/C Head Height Confirmation”)
5. If CTL level is out of specification on REV mode, confirm the height of T4 Post (refer to item “REV Tape Pass Confirmation and Adjustment”).

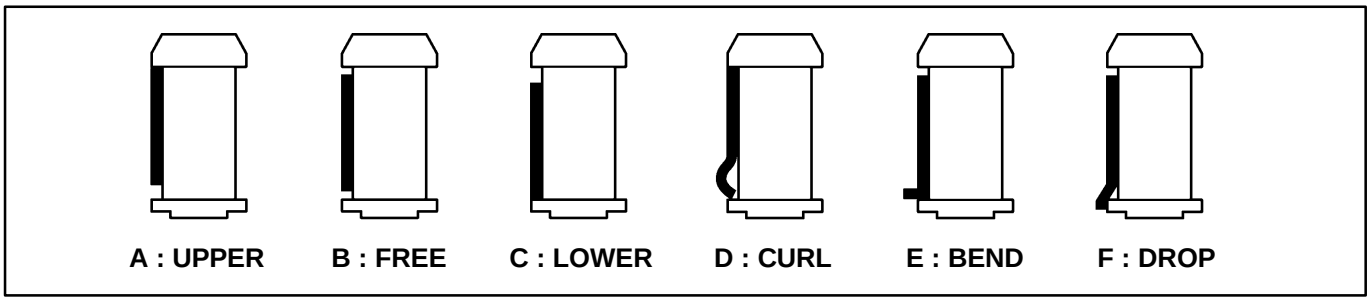
3-22. Play Tape Pass Limit Confirmation

SPEC	Each post limit shown in below figure.
MODE	PLAY
TAPE	Blank Tape

Post Name	Tape limit (refer to figure)						Adjustment Point	Adjustment Item
	A	B	C	D	E	F		
S5 post	NG	OK	OK	NG	NG	NG	S4, S5 post	Post Height Pre-Adjustment
S4 (Tension) post	NG	NG	OK	NG	NG	NG		
S1 post	OK	NG	NG	NG	NG	NG	S1, T1 post	ENV Waveform Adjustment
T1 post	OK	NG	NG	NG	NG	NG		
T3 post	NG	NG	OK	NG	NG	NG	A/C Head tilt	A/C Head Tilt Adjustment
T4 post	OK	OK	OK	NG	NG	NG	T4 post	Post Height Pre-Adjustment

Table 3-22

1. Place unit into PLAY mode and confirm the each post limits is within specification.
2. If out of specification, adjust the post height follow the each adjustment procedure (Refer to above table).



3-23. Confirmation of Envelope on REV, REW and FF mode

SPEC	See Figure 3-23	**M.EQ**	Oscilloscope
TEST POINT	See below	**TAPE**	**NTSC :** VFM3580KM or VFM3580KL **PAL :** VFM3680KM or VFM3680KL
MODE	REV, REW, FF		

(Classified list of Test Point)

TYPE	Signal	Test Point	Model
A	(1) R/P ENV (2) R/P HSW	(refer to Table of Test Point)	AJ-D200, AJ-D210, AJ-D215, AJ-D220, AJ-D230, AJ-D230H, AJ-D250, AJ-D400, AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D700, AJ-D700A, AJ-D750, AJ-D800, AJ-D800A, AJ-D810, AJ-D810A, AJ-D850, AJ-LT75, AJ-LT85, AJ-D610
B	(1) R/P ENV L (2) R/P HSW L		AJ-D90, AJ-D92, AJ-D95DC, AJ-D900W, AJ-D900WA, AJ-D94, AJ-D910WA, AJ-D950, AJ-D950A, AJ-PD900W, AJ-PD900WA
C	(1) ENV L13 (2) HSW L13		AJ-DE77, AJ-D780
D	(1) PB ENV L13 (2) PB HSW L13		AJ-D940

Table 3-23

1. Confirm that the Envelope waveform becomes in the specification on REV, REW and FF mode as refer to figure and below.
   - Waveform must be Diamond Style.
   - All the peak level must be more than 90% of maximum level.
     V/Vmax ≥ 0.9
2. If out of spec, adjust S4 post height. (refer to item "Post Height Pre-Adjustment")

NOTE 1 :
The model of except AJ-D950, AJ-D950A, AJ-D92, AJ-D95DC and AJ-D94 in TYPE B model on Table 3-23, which models should be connect to BER COUNTER (refer to item "Envelope Waveform Adjustment").

NOTE 2 :
In case of AJ-D940, setting on Service Menu required.
(refer to item 3-11.)

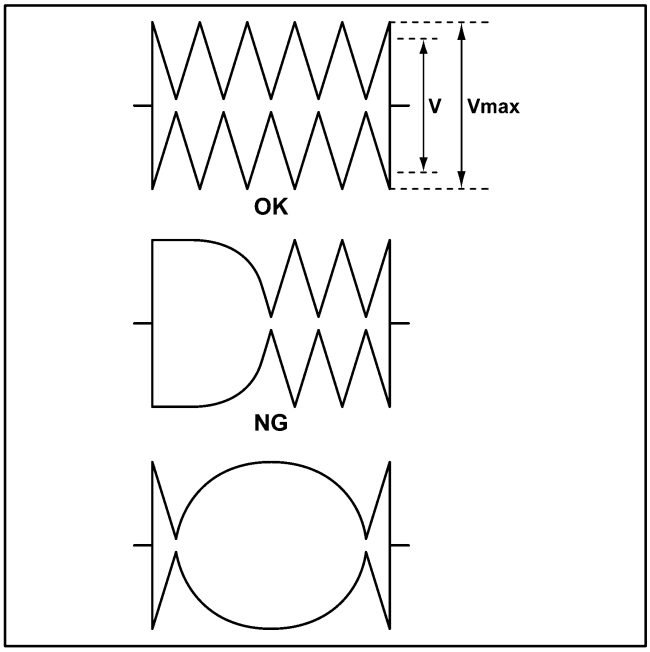


Figure 3-23

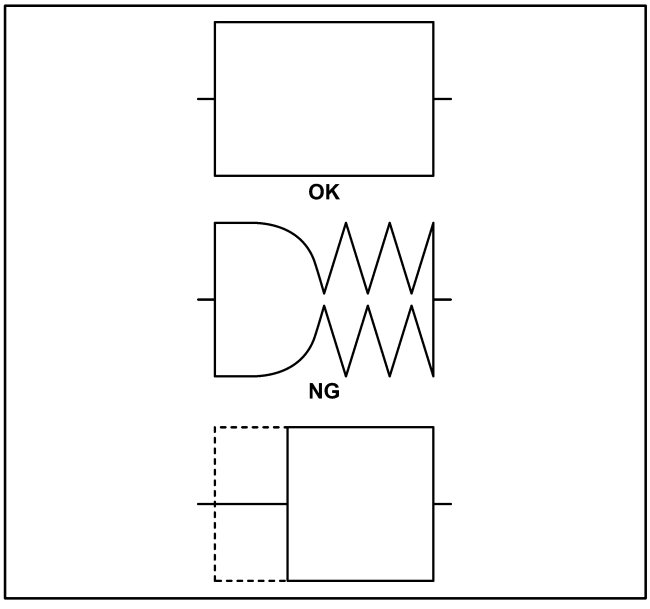
3-24. Confirmation of Play Start Envelope

SPEC	Envelope Waveform signal should be rising up immediately on PLAY mode.
TEST POINT	Refer to Table 3-23 on previous item "3-23. Confirmation of Envelope on REV/REW and FF mode".
MODE	REW/REV → PLAY, Loading completion → PLAY, FF → PLAY
TAPE	① L Cassette (123min, Recorded tape) Tape beginning portion [for models AJ-D200, AJ-D210, AJ-D215, AJ-D940] ② M Cassette (63min, Recorded tape) Tape beginning portion [for except above models]
M.EQ	Oscilloscope

This adjustment must be done after Envelope Waveform Adjustment.

1. Confirm that the envelope appears immediately, when the mode is changed from REW to PLAY, REV to PLAY, FF to PLAY, and Lording to PLAY mode.
2. If out of spec, adjust S4 post height. (refer to item "Post Height Pre-Adjustment")

NOTE :
In case of AJ-D940, setting on Service Menu required.
(refer to item 3-11.)



3-25. REV mode Tape Pass Limit Confirmation

SPEC	Each post limit shown in below figure
MODE	REV
TAPE	**NTSC :** VFM3580KM or VFM3580KL **PAL :** VFM3680KM or VFM3680KL

Post Name	Tape Limit (Refer to figure 3-25)					
	A	B	C	D	E	F
S5 Post	OK	OK	OK	NG	NG	NG
S4 Post (Tension Post)	NG	OK	OK	NG	NG	NG
S1 Post	OK	NG	NG	NG	NG	NG
T1 Post	OK	OK	OK	NG	NG	NG
T3 Post	NG	NG	OK	NG	NG	NG
T4 Post	OK	OK	OK	NG	NG	NG

1. Place unit into REV mode and confirm the each post limits is within specification.
2. If out of specification, adjust the post height follow the each adjustment procedure (Refer to Table 3-22 on item 3-22)

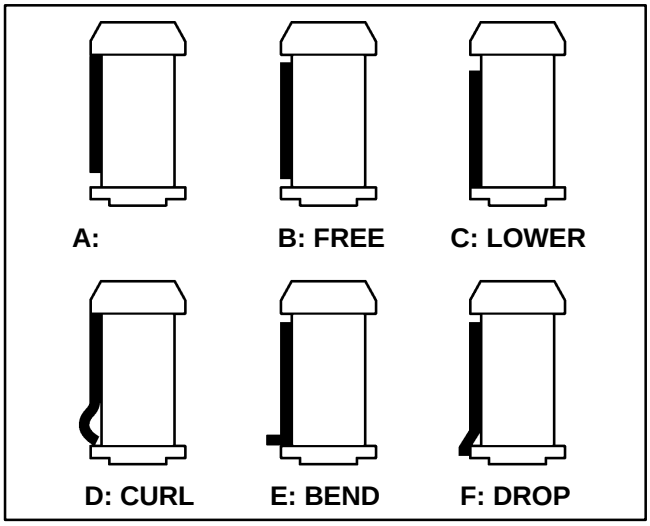


Figure 3-25

3-26. FF, REW mode Tape Pass Limit Confirmation

SPEC	Each post limit shown in below figure
MODE	FF, REW
TAPE	**NTSC :** VFM3580KM or VFM3580KL **PAL :** VFM3680KM or VFM3680KL

Post Name	Tape Limit (Refer to figure 3-25)					
	A	B	C	D	E	F
S5 Post	OK	OK	OK	NG	NG	NG
S4 Post (Tension Post)	NG	OK	OK	NG	NG	NG
S1 Post	OK	NG	NG	NG	NG	NG
T1 Post	OK	OK	OK	NG	NG	NG
T3 Post	OK	OK	OK	NG	NG	NG
T4 Post	OK	OK	OK	NG	NG	NG

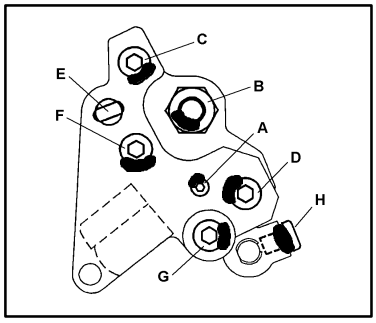
1. Place unit into FF and REW mode and confirm the each post limits is within specification.
2. If out of specification, adjust the post height follow the each adjustment procedure (Refer to Table 3-22 on item 3-22)

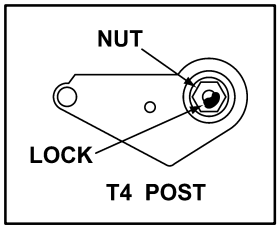
3-27. Screw Lock Tight of A/C Head and T3, T4 Post

<Screw Lock Tight of A/C Head>

	SCREW A	OTHER SCREWS
Lock Tight Grew Quantity	1/3 of the screw	1/3 of the screw

1. Fix the screw by the Lock Tight Grew after A/C Head Adjustment as shown in below figure.
2. Melt the grew before adjust each screws.





<Screw Lock Tight of T3 and T4 Post>

	SCREW A	OTHER SCREWS
Lock Tight Grew Quantity	1/4 of the screw	1/4 of the screw

1. Fix the Nut by the Lock Tight Grew after T4 Post Height Adjustment.
2. Melt the grew before perform adjustment.

3-28. Confirmation of Tape Damage for Long Tape Playback

<Classified list>

TYPE	Model	How to set step slow mode	Tape Type
A	AJ-D750JSB, AJ-D850	Search Dial	25M
B	AJ-LT85	Search Dial	25M
C	AJ-D230H, AJ-D250	Open the Service menu and press together END, STOP, and FF button.	25M
D	AJ-DE77	Search Dial on Front Panel (AJ-D750)	25M
E	AJ-D780	Search Dial on Remote Controller	
F	AJ-D950, AJ-D950A	Search Dial	50M
G	AJ-D92, AJ-D94, AJ-D95DC	**NOTE :** These model can not set step slow mode	50M
H	AJ-D440, AJ-D450	Search Dial on Remote Controller	25M
I	AJ-D940	Set +0.1 speed by Search Dial on 50M playback mode	50M
J	AJ-D215	**NOTE :** This model can not set step slow mode	25M

<Confirmation procedure>

<table>
<tr><th>Item</th><th colspan="2">Confirmation mode</th><th>Specification</th></tr>
<tr><td rowspan="5">Tape Damage ①</td><td colspan="2">PLAY</td><td rowspan="5">Tape damage does not occurred on tape at lower limit of T3 and T4 post.</td></tr>
<tr><td>Step slow mode</td><td>TYPE</td></tr>
<tr><td>×0.5 speed (step slow)</td><td>A, E, H</td></tr>
<tr><td>×0.1 speed (step slow)</td><td>B, C, D, I</td></tr>
<tr><td colspan="2"><Tape>
Long time L cassette (AJ-5P93LP : recorded tape)
Tape beginning portion</td></tr>
<tr><td rowspan="3">Tape Damage ②</td><td colspan="2">PLAY</td><td rowspan="3">Tape damage does not occurred on tape at lower limit of T3 and T4 post.</td></tr>
<tr><td colspan="2">Repeat operation CUE←→REV mode
(maximum speed at Pinch ON condition)</td></tr>
<tr><td colspan="2"><Tape>
Long time L cassette (AJ-5P93LP : recorded tape)
Tape end portion</td></tr>
</table>

3-29. LISTA Adjustment Procedure

With procedure of LISTA adjustment, which is difference of each models. Please select the number of corresponded procedure follow the below Table 3-29-1. And when execute the LISTA Adjustment, please adjust each items follow the flow chart.

<Classified list of LISTA Adjustment Procedure>

Procedure	Models
Procedure (1)	AJ-D200, AJ-D210, AJ-D215, AJ-D220, AJ-D230, AJ-D230H, AJ-D250, AJ-D400, AJ-D700, AJ-D700A, AJ-D800, AJ-D800A, AJ-D810, AJ-D810A, AJ-D610
Procedure (2)	AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D750, AJ-D850, AJ-LT75, AJ-LT85
Procedure (3)	AJ-D90, AJ-D900W, AJ-D900WA, AJ-D910WA, AJ-PD900W, AJ-PD900WA
Procedure (4)	AJ-D92, AJ-D94, AJ-D95DC AJ-D950, AJ-D950A
Procedure (5)	AJ-DE77, AJ-D780
Procedure (6)	AJ-D940

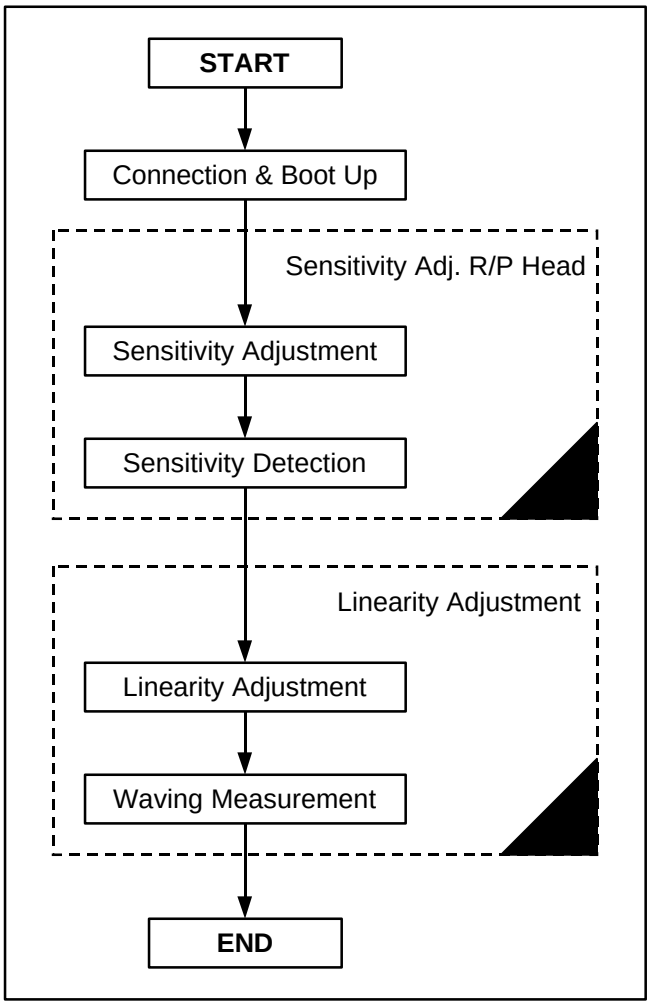
Table 3-29-1

NOTE :

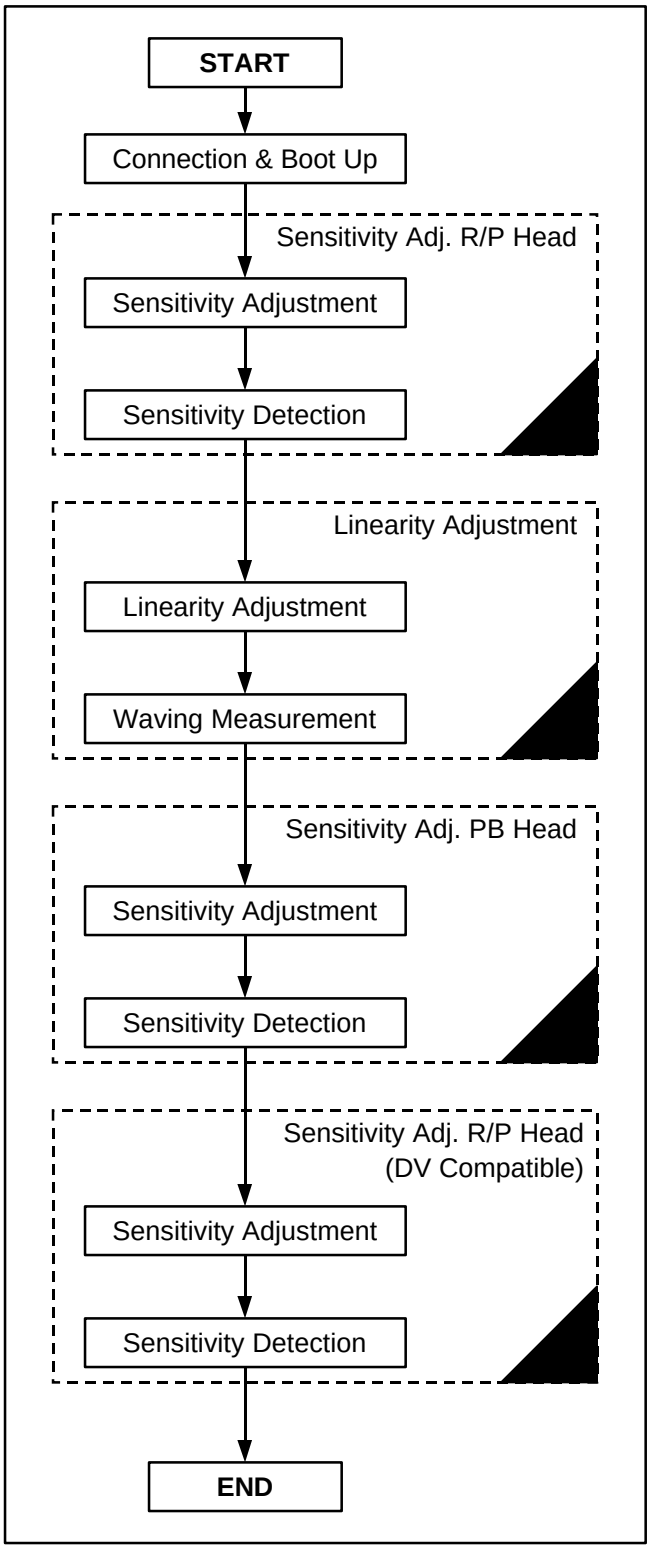
1. Refer to the item "3-32. LISTA Sensitivity Adjustment & Detection" about procedure of the sensitivity adjustment and sensitivity detection.
2. Refer to the item "3-33. LISTA Linearity Adjustment & Waving Measurement" about procedure of the linearity adjustment.

Procedure (1)

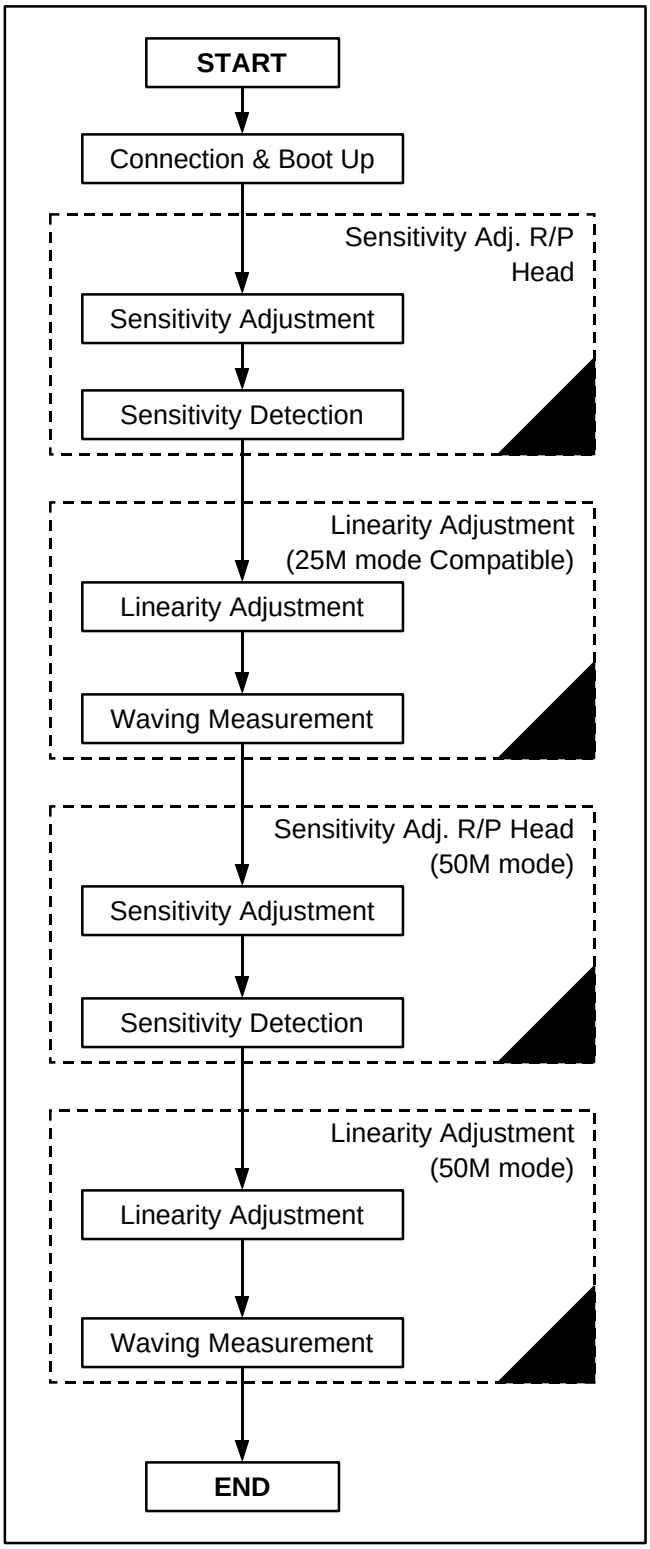
(25M Camera Recorder, Desk-top)



Procedure (2)
(25M Studio VTR, Lap-top Editor)

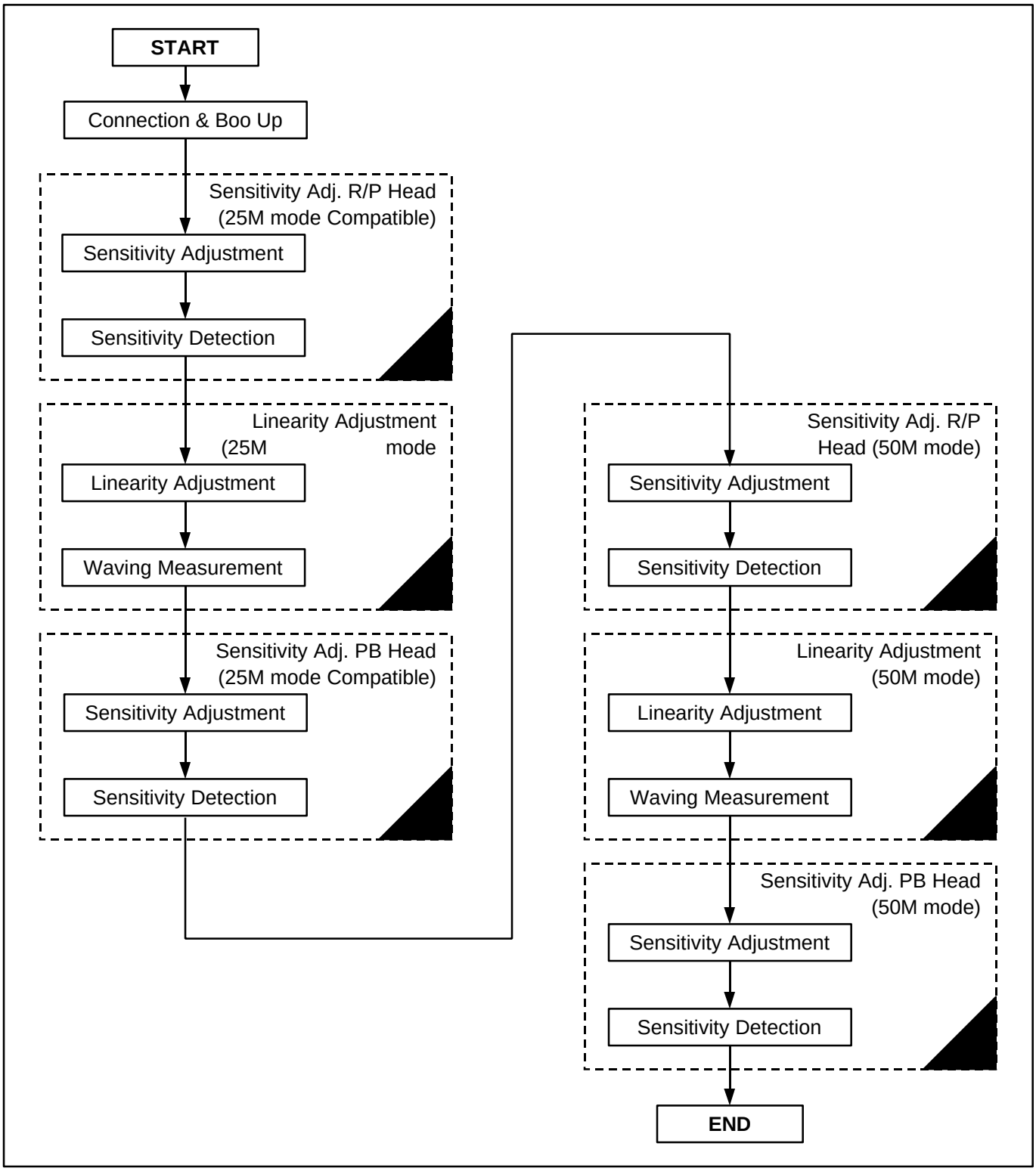


Procedure (3)
(50M Camera Recorder)



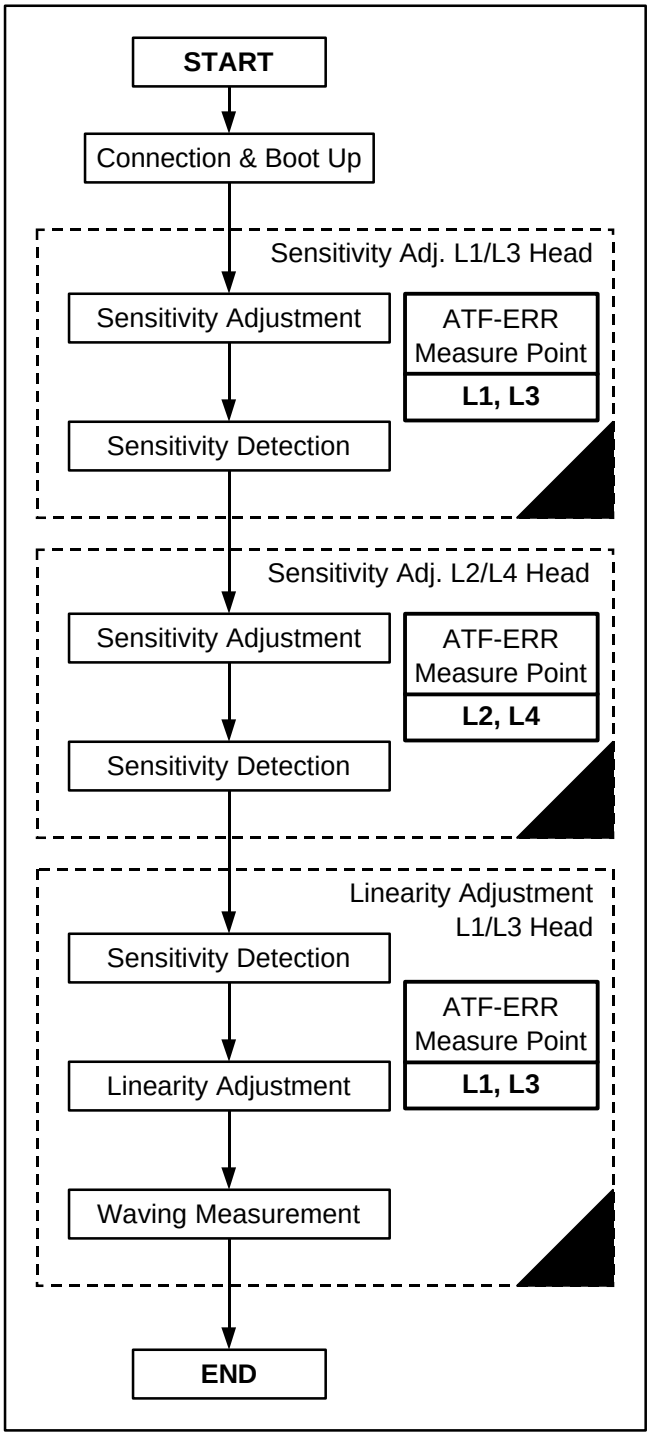
<Information>
Mode changes 25M ←→ 50M of LISTA software can be performed on the LISTA main menu by press **"0"** key on Keyboard of PC..

Procedure (4)
(50M Studio VTR, Recorder)

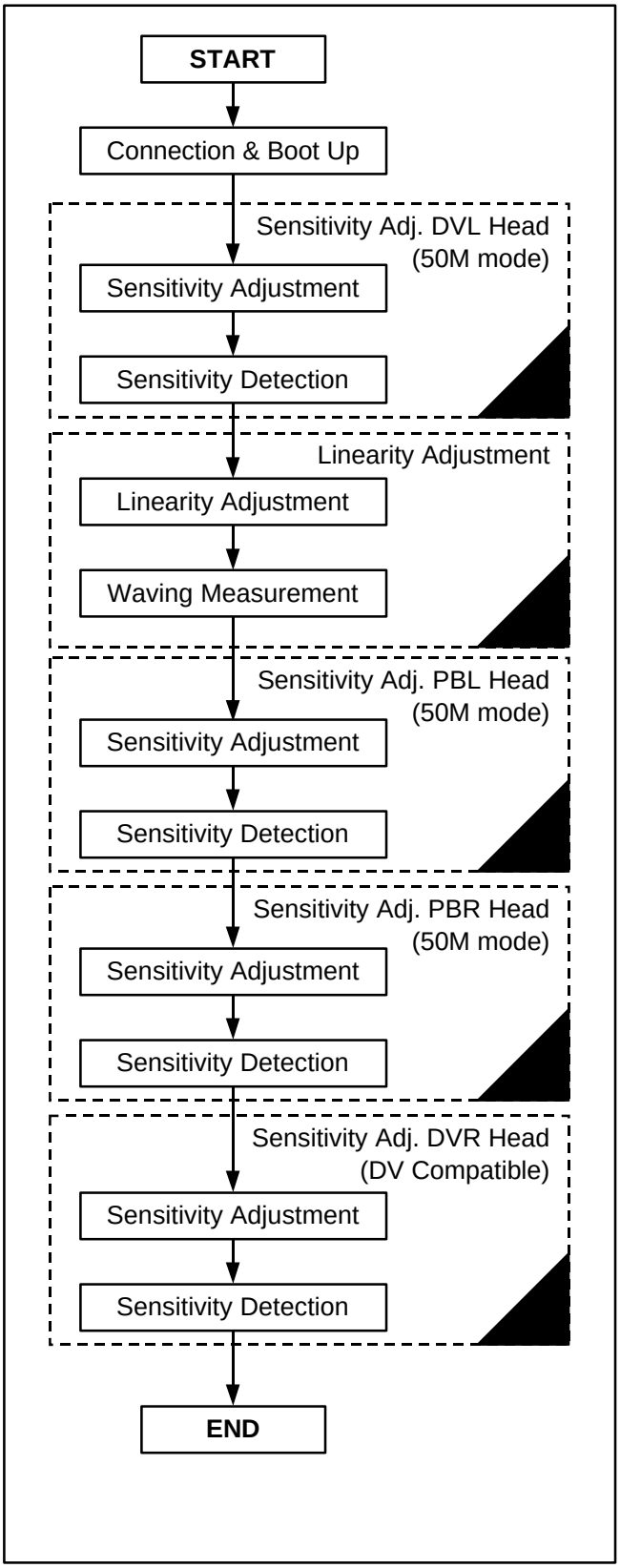


<Information>
Mode changes 25M ←→ 50M of LISTA software can be performed on the LISTA main menu by press **"0"** key on Keyboard of PC..

Procedure (5) **(4X Transmitter)**



Procedure (6) **(AJ-D940)**



3-30. LISTA Connection and Boot Up

TEST POINT	ATF ERR	Refer to item “2. Table of Test Point”.
	HSW RP	
	HSW PB	
	GND	
M. EQ.	PC (Personal Computer) (A/D board should be installed)	
TAPE	**NTSC :** VFM3581KM or VFM3581KL (LISTA), VFM3000EDS (DV LISTA) **PAL :** VFM3681KM or VFM3681KL (LISTA), VFM3000EDS (DV LISTA)	

TOOL	**Type**	**Part No. and Part Name**
	A	VFK1481 (LISTA Software), VFK1186 (LISTA Cable)
	B	VFK1481 (LISTA Software), VFK1186 (LISTA Cable), VFKW1000AA (EVR I/F Unit), VFKW1000C (EVR RS232C Cable), VFK1180 (EVR SUB I/F Unit), VFK1187 (EVR Cable)
	C	VFK1481 (LISTA Software), VFK1186 (LISTA Cable), 9P-9P RS232C Cross Cable

<Classified list for LISTA Connection>

Type	**Models**
A	AJ-D220, AJ-D230, AJ-D230H, AJ-D250, AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D750, AJ-D780, AJ-D850, AJ-D940, AJ-D950, AJ-D950A, AJ-D92, AJ-D95DC, AJ-DE77, AJ-LT75, AJ-LT85, AJ-D94
B	AJ-D400, AJ-D700, AJ-D700A, AJ-D800, AJ-D800A, AJ-D810, AJ-D810A, AJ-D90, AJ-D900W, AJ-D900WA, AJ-D910WA, AJ-PD900W, AJ-PD900WA, AJ-D610
C	AJ-D200, AJ-D210, AJ-D215

1. Connect the LISTA cable to A/D Board in the PC.
2. Connect the clips of the LISTA cable to test point on the P.C.Board.
3. Connect the EVR tool as shown in figure 3-30 about type B models on the above table.
4. Connect the VTR and PC by using the RS232C cross cable about type C models on the above table.

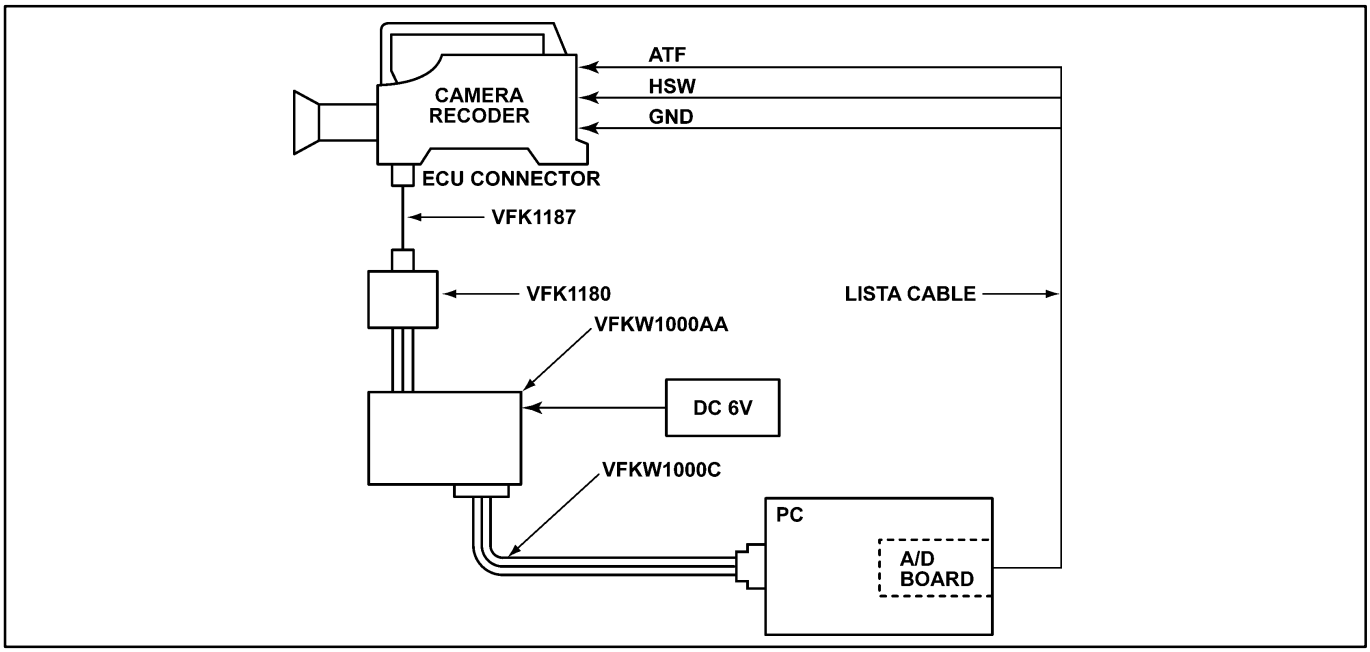


Figure 3-30

5. Boot up the LISTA software on DOS mode.

♦ How to Installation and Boot Up ♦

All files on the floppy disk (VFK1481 : LISTA Software) copy to created directly on PC (**i.e.;** C:\LISTA).

Type **"LISTA"** and press **ENTER** key, then boot up the LISTA software VFK1481.

6. After boot up the LISTA software, <<< FORMAT SELECT >>> display appeared. Select the format according to models as shown below table 1.

<<< FORMAT SELECT >>> according to Models

Items	Models
<1> DVCPRO	AJ-D200, AJ-D210, AJ-D215, AJ-D220, AJ-D230, AJ-D230H, AJ-D250, AJ-D400, AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D700, AJ-D700A, AJ-D750, AJ-D800, AJ-D800A, AJ-D810, AJ-D810A, AJ-D850, AJ-LT75, AJ-LT85, AJ-D610
<2> DVCPRO 4X	AJ-DE77, AJ-D780
<3> DVCPRO 50	AJ-D90, AJ-D900W, AJ-D900WA, AJ-D910WA, AJ-D92, AJ-D940, AJ-D95DC, AJ-D950, AJ-D950A, AJ-PD900W, AJ-PD900WA, AJ-D94

Table 1

7. After select the format, **<<< VTR SELECT >>>** display appeared, and select the model follow the table 2, 3 and 4 as shown below.

<<< VTR SELECT >>> according to Models (In case of "DVCPRO" selected on FORMAT SELECT screen)

Items	Models
<1> AJ-D750	AJ-D220, AJ-D230, AJ-D230H, AJ-D250, AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D750, AJ-D850, AJ-LT75, AJ-LT85
<2> AJ-D700	AJ-D400, AJ-D700, AJ-D700A, AJ-D800, AJ-D800A, AJ-D810, AJ-D810A, AJ-D610
<3> AJ-D200	AJ-D200, AJ-D210, AJ-D215

Table 2

<<< VTR SELECT >>> according to Model (In case of "DVCPRO 4X" selected on FORMAT SELECT screen)

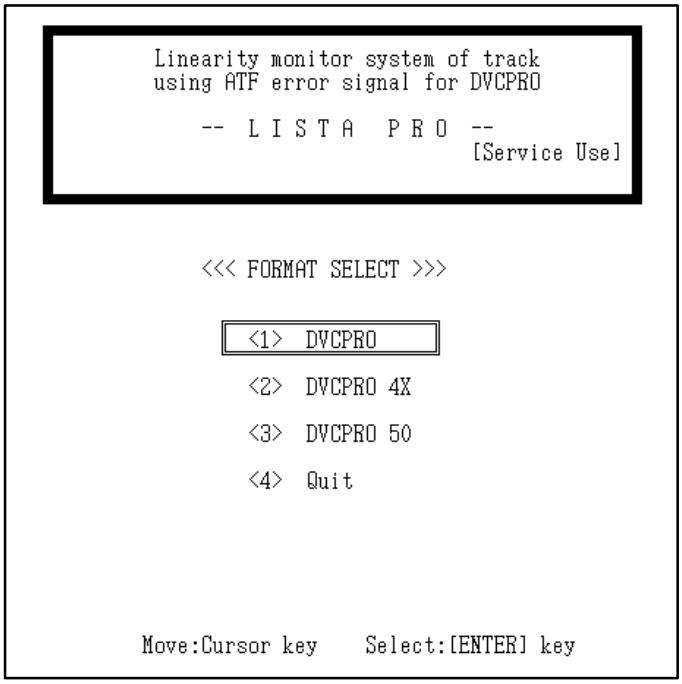
Item	Model
<1> AJ-DE77	AJ-DE77, AJ-D780

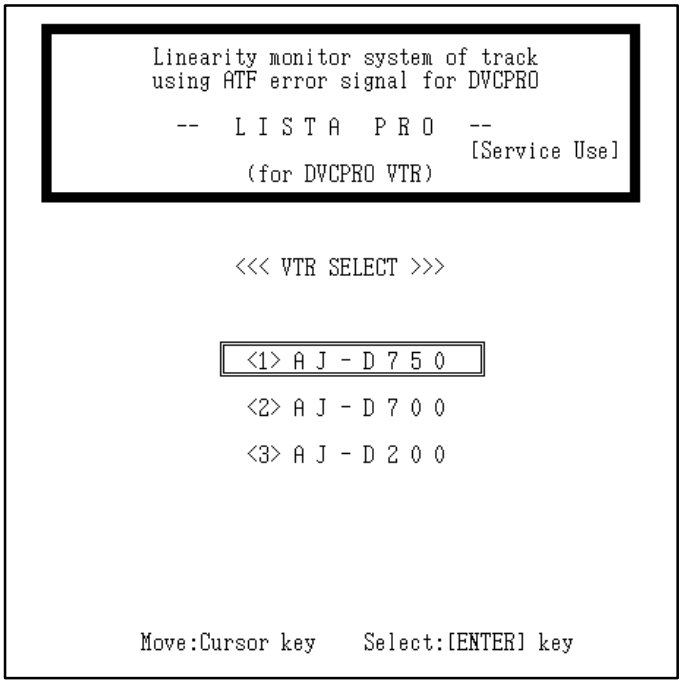
Table 3

<<< VTR SELECT >>> according to Models (In case of "DVCPRO 50" selected on FORMAT SELECT screen)

Items	Models
<1> AJ-D900	AJ-D900W, AJ-D900WA, AJ-D910WA
<2> AJ-D950	AJ-D92, AJ-D94, AJ-D940, AJ-D95DC, AJ-D950, AJ-D950A
<3> AJ-D90	AJ-D90
<4> AJ-PD900	AJ-PD900W, AJ-PD900WA

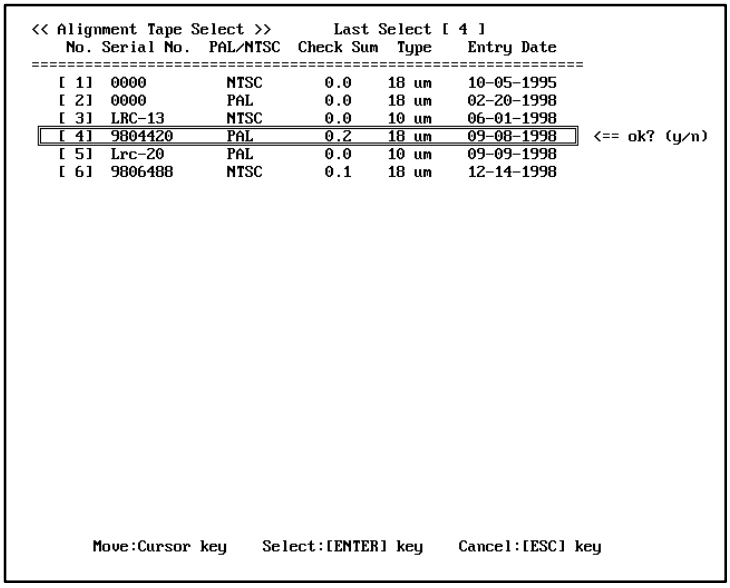
Table 4



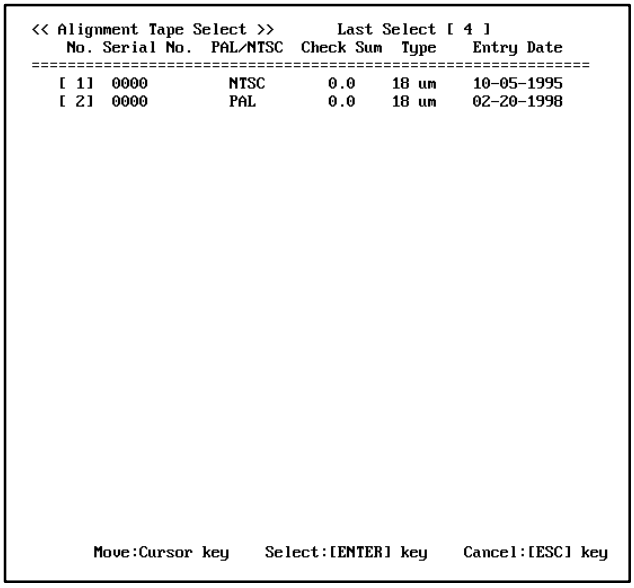


8. Next, select the Serial number of the Alignment tape on the screen. In case of LISTA software have not resisted data of alignment tape, press the ESC key, then main menu is display on the screen. And select the item “<4> Alignment Tape” for entry the data on the attachment sheet, which is enclosed of alignment tape.
9. In case of LISTA software have resisted data of alignment tape, select the serial number of Alignment tape, then appear message “ok?(y/n)” on the screen. And press “ Y ” or “ ENTER ” key, then LISTA main menu is display on screen.

<< In case of Alignment Tape resisted already >>



<< In case of Alignment Tape does not resisted >>



3-31. How to Entry the Attachment Data of Alignment Tape

1. Select the item ”<4> Alignment Tape” on the LISTA main menu.
2. Select the item ”<2> ENTRY” on the alignment menu.
3. After display the screen of <<Alignment Tape Data Entry>>, first input the Serial Number follow the printed number on the tape label. And input the number “0” or “1” for selected the PAL/NTSC. And after that for entry the tape type, incase of DVCPRO input to “0”, in case of DV input to “1”.
4. After select the tape type, the frame for input the DATA and CHECK SUM appeared on the screen. Input the numerical value in numerical order on the data sheet, which are enclosed with alignment tape. If input the wrong number, appear the error message on the screen, then confirm that the data on the sheet.
5. After entry the data, select “<1> SELECT” on the Alignment Tape Menu and select the serial number of the alignment tape.

<< Alignment Tape Data Entry >> Serial No. 0596003 (NTSC) 18um

[1]	- 0.1
[2]	0.1
[3]	0.0
[4]	0.2
[5]	0.6
[6]	0.5
[7]	0.7
[8]	0.9
[9]	1.0
[10]	0.8

[11]	0.7
[12]	1.0
[13]	0.7
[14]	0.5
[15]	0.2
[16]	- 0.5
[17]	- 0.3
[18]	- 0.3
[19]	- 0.1
[20]	- 0.6

[21]	- 0.4
[22]	- 0.2
[23]	- 0.7
[24]	- 0.6
[25]	- 0.7
[26]	- 0.3
[27]	- 0.4
[28]	- 0.4
[29]	- 0.6
[30]	- 0.3

[31]	- 0.4
[32]	- 0.6
[33]	- 0.3
[34]	- 0.2
[35]	- 0.1
[36]	- 0.3
[37]	- 0.1

[CS]	- 0.6

3-32. LISTA Sensitivity Adjustment and Sensitivity Detection

TEST POINT	ATF ERR HSW GND	Refer to item “2. Table of Test Point” and [LISTA Adjustment Mode] on “Table of Test Point”.
VTR MODE	PLAY	
ADJ. MODE	Select the mode according to adjusting Heads and adjustment mode. Refer to [LISTA Adjustment Mode] on “Table of Test Point”.	
ADJUST (ATF GAIN)	Select the mode according to adjusting Heads and adjustment mode. Refer to [LISTA Adjustment Mode] on “Table of Test Point”.	
TAPE	**Type**	**Tape**
	A, D, J	**NTSC :** VFM3581KM (LISTA), **PAL :** VFM3681KM (LISTA) VFM3000EDS (DV LISTA : When use the DV compatible mode Adj..)
	B, E, F, G, H, I	**NTSC :** VFM3581KM (LISTA), **PAL :** VFM3681KM (LISTA)
	C	**NTSC :** VFM3581KL (LISTA), **PAL :** VFM3681KL (LISTA)

<Classified list for Sensitivity Adjustment>

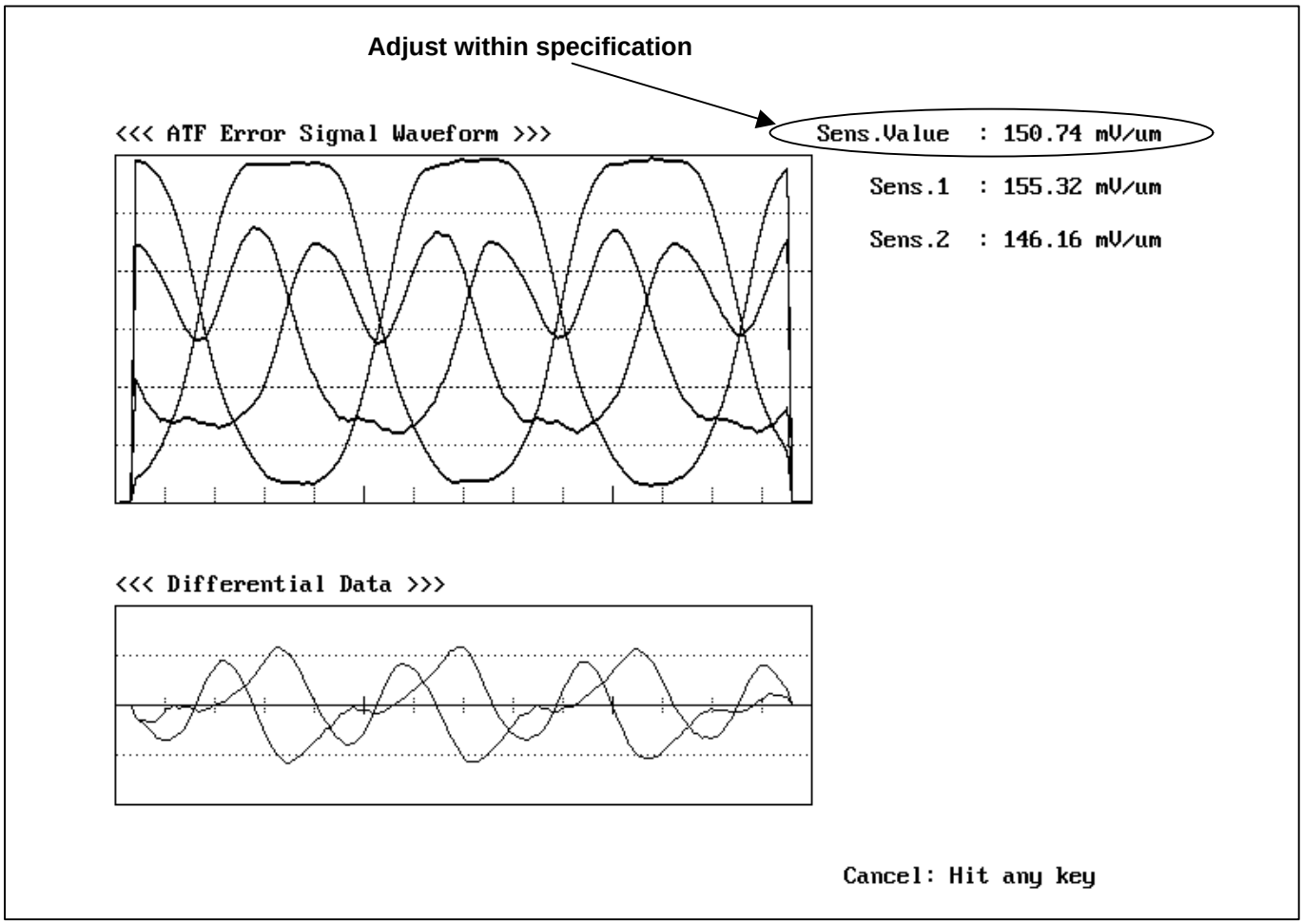
Type	Models
A	AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D750, AJ-D850
B	AJ-D400, AJ-D610, AJ-D700, AJ-D700A, AJ-D800, AJ-D800A, AJ-D810, AJ-D810A
C	AJ-D200, AJ-D210, AJ-D215
D	AJ-LT75, AJ-LT85
E	AJ-D220, AJ-D230, AJ-D230, AJ-D230H
F	AJ-D780, AJ-DE77
G	AJ-D950, AJ-D950A
H	AJ-D90, AJ-D900W, AJ-D900WA, AJ-D910WA, AJ-PD900W, AJ-PD900WA
I	AJ-D92, AJ-D94, AJ-D95DC
J	AJ-D940

<Specification of confirmation and Adjustment according to Models>

Type	Adjustment Heads and Sensitivity Value (mV/μm)							
	Normal (25M Model→25M, 50M Model→50M)				25M Compatible (50M)		DV Compatible	
	R/P Head	PB (L) Head	PB (R) Head	DVL Head	R/P Head	PB Head	R/P Head	DVR Head
A, D	150 ± 15	150 ± 15	-----	-----	-----	-----	130 ± 30	-----
B, C	100 ± 10	-----	-----	-----	-----	-----	-----	-----
E, F	150 ± 15	-----	-----	-----	-----	-----	-----	-----
G, I	150 ± 15	150 ± 15	-----	-----	150 ± 15	150 ± 15	-----	-----
H	100 ± 10	-----	-----	-----	100 ± 10	-----	-----	-----
J	-----	100 ± 10	150 ± 15	150 ± 15	-----	-----	-----	200 ± 20

Sensitivity Adjustment Procedure (In case of type A, D, E, F, G, I and J Models)

1. Connect the each clips of LISTA cable to test point.
2. Set the adjustment mode according to adjustment heads.
   (Refer to [LISTA Adjustment Modes] of the “Table of Test Point”.)
3. Playback the LISTA Alignment Tape.
4. Select the item “<6> ATF Error Signal Monitor” on the LISTA main menu, and after appeared message ”1.2% Speed. . .” on the screen, press the Enter key, then sensitivity value as real time and waveform appear on the screen as shown below figure.
5. Adjust EVR so that the “Sens. Value” on the upper right corner of the screen is within specification.
6. After finish this adjustment, press the ESC key to return to the main menu.



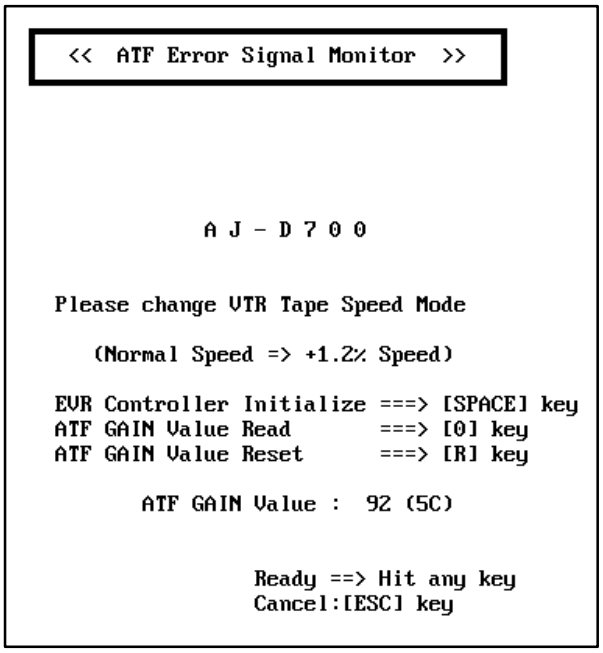
Sensitivity Adjustment Procedure (In case of type B and H Models)

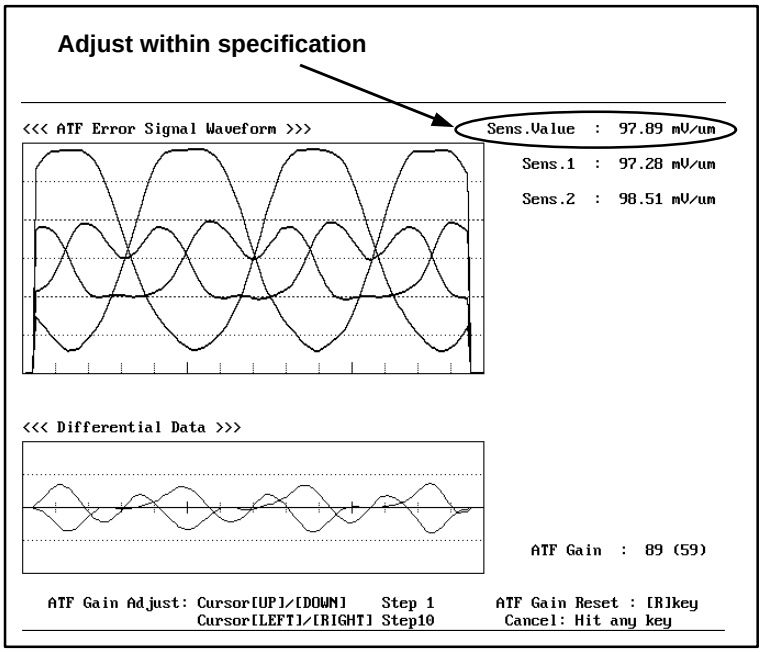
1. Connect the each clips of LISTA cable to test points.
2. Set the adjustment mode according to adjustment heads.
   (Refer to [LISTA Adjustment Modes] of the “Table of Test Point”.)
3. Playback the LISTA Alignment Tape.
4. Select the item “<6> ATF Error Signal Monitor” on the LISTA main menu, and press the SPACE key and execute the “Initialize”. After finish the Initialize, press the ”0” key for download the adjustment value of ATF GAIN. Next, press the Enter key and displayed real time sensitivity data.
5. The waveform as shown below figure appeared on the screen, press arrow keys on the keyboard of the PC so that the “Sens. Value” on the upper right corner of the screen is within specification.

   Information 1 : Press the **“↑”** or **“↓”** key : The value changes by 1 step.
   Press the **“→”** or **“←”** key : The value changes by 10 step.
   After corrected the data, the screen is disappeared momentary during the calculating on LISTA software.

   Information 2 : The data “85” appear on the screen before adjustment, but this value does not VTR’s value. This value is equal to VTR’s value after transmit the data once.

6. After finish this adjustment, press the ESC key to return to the main menu.





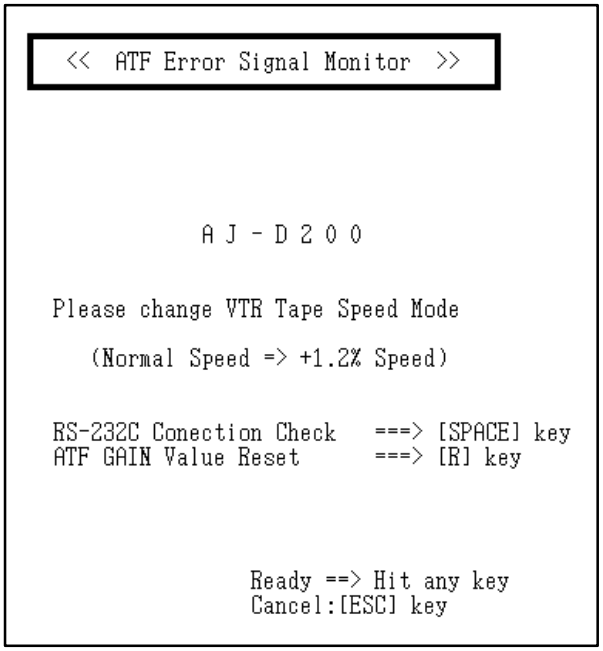
Sensitivity Adjustment (In case of type C Models)

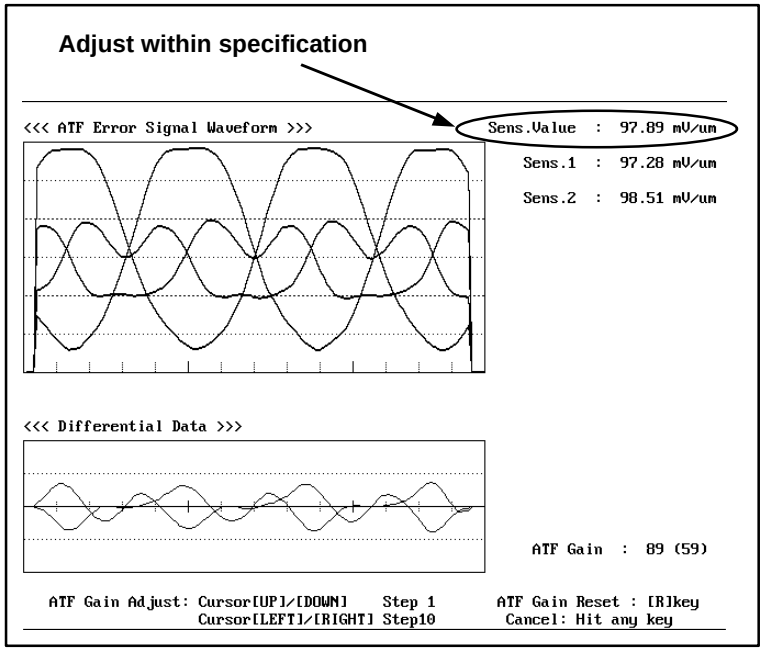
1. Connect the each clips to LISTA cable to test points.
2. Set the adjustment mode according to adjustment heads.
   (Refer to [LISTA Adjustment Modes] of the “Table of Test Point”.)
3. Playback the LISTA Alignment Tape.
4. Select the item “<6> ATF Error Signal Monitor” on the LISTA main menu, and press the SPACE key for execute the “RS232C Connector Check”. Normally the message “RS232C CONNECTION COMPLETE!!!” and “ATF GAIN value” appeared on screen. After finish the Connection check, press the ”0” key for download the adjustment value of ATF GAIN. Next, press the Enter key and displayed real time sensitivity data.
5. The waveform as shown below figure appeared on the screen, press arrow keys on the keyboard of the PC so that the “Sensitivity. Value” on the upper right corner of the screen is within specification.

   Information 1 : Press the **“↑”** or **“↓”** key : The value changes by 1 step.
   Press the **“→”** or **“←”** key : The value changes by 10 step.
   After corrected the data, the screen is disappeared momentary during the calculating on LISTA software.

   Information 2 : The data “85” appear on the screen before adjustment, but this value is not VTR’s value.
   This value is equal to VTR’s value after transmit the data once.

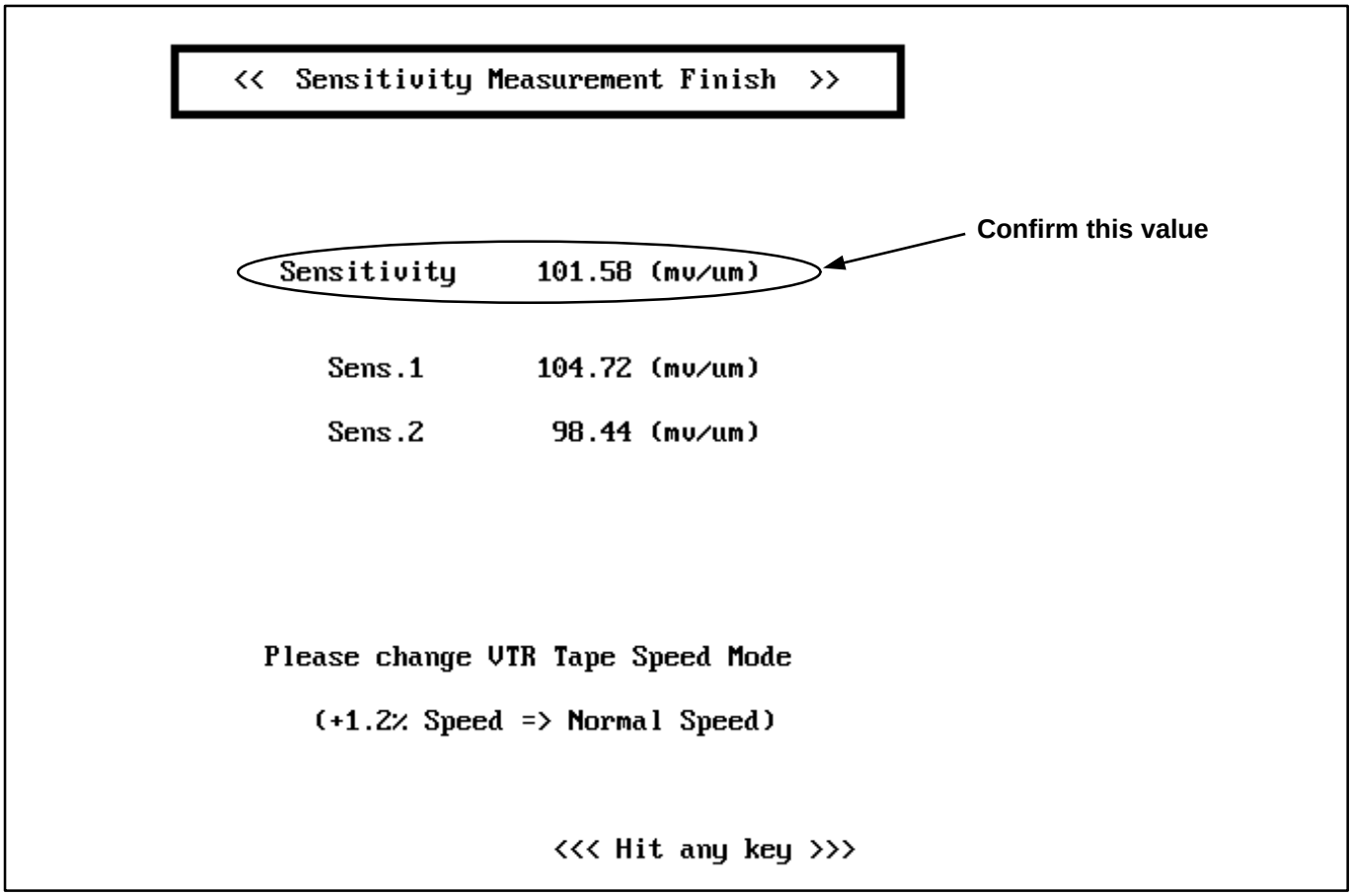
6. After finish this adjustment, press the ESC key to return to the main menu.





Sensitivity Detection Procedures (Common to all Models)

1. Set the adjustment mode. (Refer to [LISTA Adjustment Modes] of the “Table of Test Point”.)
2. Playback the LISTA Alignment Tape.
3. Select the item “<1> Sensitivity Measurement” on the LISTA main menu, and then appeared ”1.2% Speed. . .” on the screen, press the Enter key, and then start measurement of the sensitivity value.
4. Confirm the sensitivity value is within specification, when the message <<Sensitivity Measurement Finish>> and “Sensitivity = Sensitivity Value” are displayed on screen.
5. If it is out of specification, repeat the step item 3 and 4.
6. If still out of specification, execute the “Sensitivity Adjustment” again.



3-33. LISTA Linearity Adjustment and Waving Measurement

SPEC.	Linearity : less than 3um, Waving : less than 1.5um **NOTE :** Confirm the above specification put VTR horizontally and vertically with AJ-D92 and 94. (Refer to figure 1)	
TEST POINT	Refer to [LISTA Adjustment Modes] on item “2. Table of Test Point”.	
VTR MODE	PLAY	
ADJ. MODE	Select the mode according to adjusting Heads and mode. Refer to [LISTA Adjustment Mode] on item “2. Table of Test Point”.	
ADJUST	S1 and T1 Post Height	
TOOL	VFK1149 (Post Driver)	
TAPE	**Type**	**Tape**
	A, B, D, E, F, G, H, I, J	**NTSC** : VFM3581KM (LISTA) **PAL** : VFM3681KM (LISTA)
	C	**NTSC** : VFM3581KL (LISTA) **PAL** : VFM3681KL (LISTA)

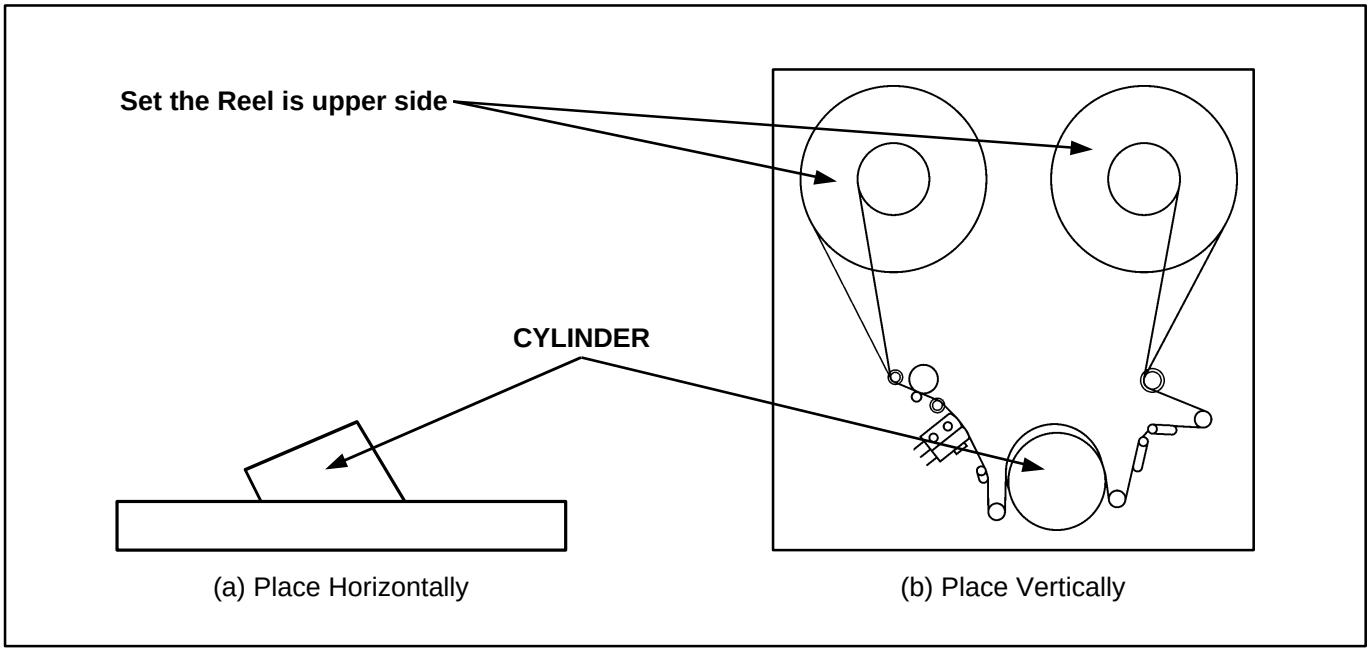
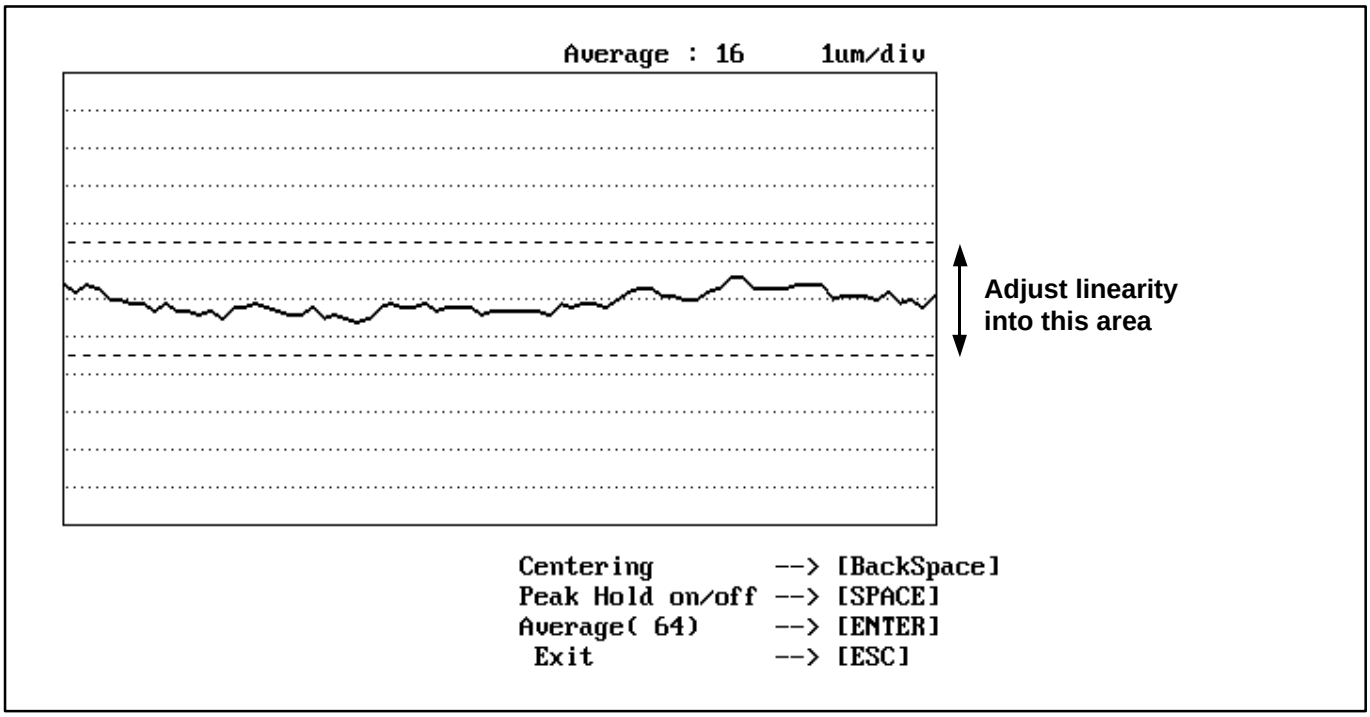


Figure 1

Linearity Adjustment Procedures

1. Connect the each clips of LISTA cable to test points.
2. Set the adjustment mode. (Refer to [LISTA Adjustment Modes] on the “Table of Test Point”.)
3. Playback the LISTA Alignment Tape.
4. Select the item “<2> Linearity Measurement” on the LISTA main menu, and then linearity waveform appeared on the screen.
5. When the waveform as shown below figure is displayed on the screen, press the ”BS (Back Space)” key for display the waveform positioned at the center of the scale on screen. Adjust S1 and T1 post height by using the post driver so that the linearity waveform is become flat as possible, and it should be within specification.

♦ Adjust linearity waveform in the red dot line on the screen.



POINT :

The part of left side of waveform (entrance side) is adjusted by height of S1 post and part of right side of waveform (exit side) is adjusted by height of T1 post.

Lower part of above waveform of figure is displayed lead of Cylinder.

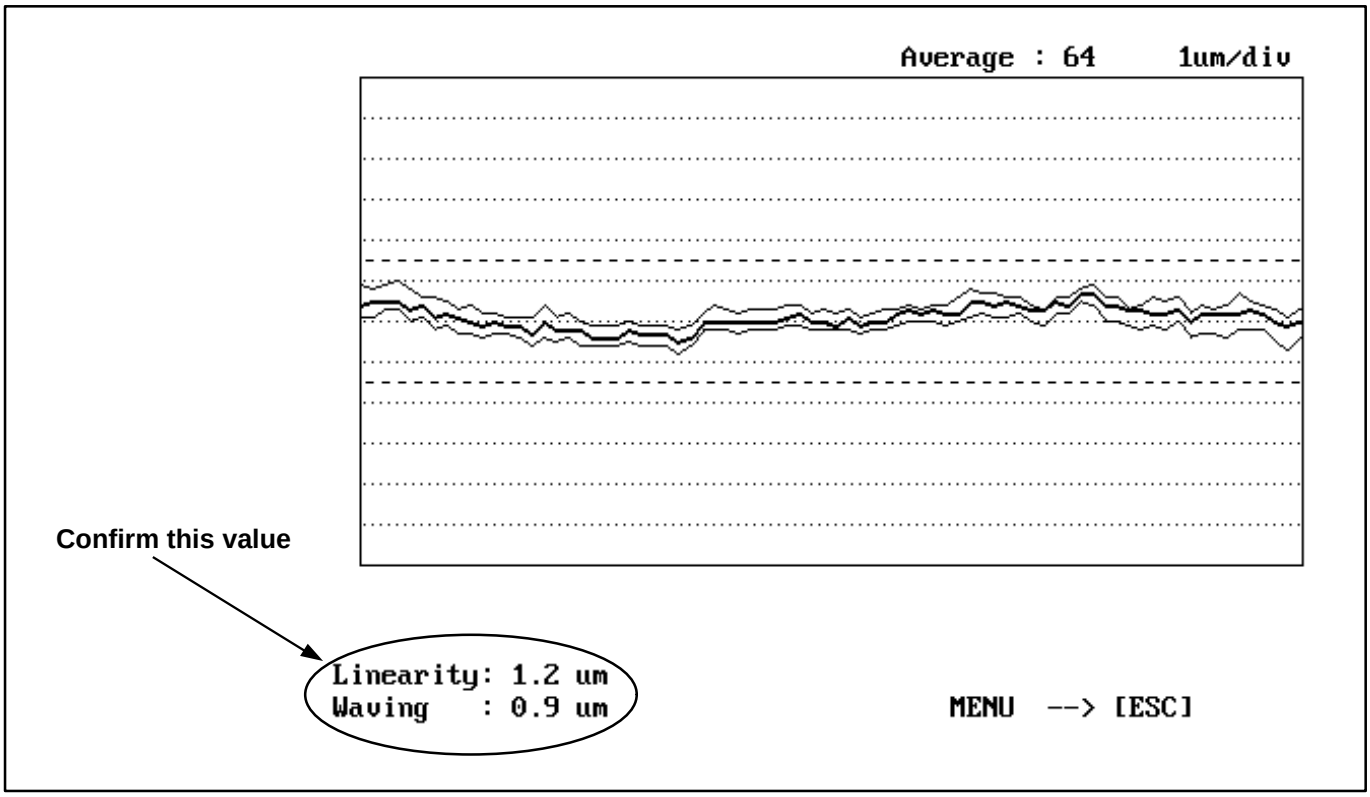
When the post driver is remove from upper part of post, linearity waveform is changed.

After finish this adjustment, eject the tape and insert the tape again for confirm the shape of linearity waveform does not changed.

6. After finish the Linearity Adjustment, measure the numerical value of linearity and waving.

Waving Measurement Procedures

1. Press “SPACE” key for make the Peak Hold during 30 seconds when linearity is displayed.
2. After finish the Peak Hold, press “SHIFT” and “ } “ key simultaneously on the Key Board, then display the numerical values of “Linearity” and “Waving” on left lower portion of screen. And confirm the numerical values are in the specification. Also confirm the range of waving waveform is same quantity from entrance side to exit side. If the “Linearity” and “Waving” are out of specification and it caused by not enough limit of entrance or exit side of envelope, then adjust height of S1 and T1 post.
3. After this measurement is finished, press the ESC key to return to the main menu.



Information : How to save the LISTA Data

The LISTA software can be saved linearity waveform and measurement value of linearity and waving as one file data to PC.

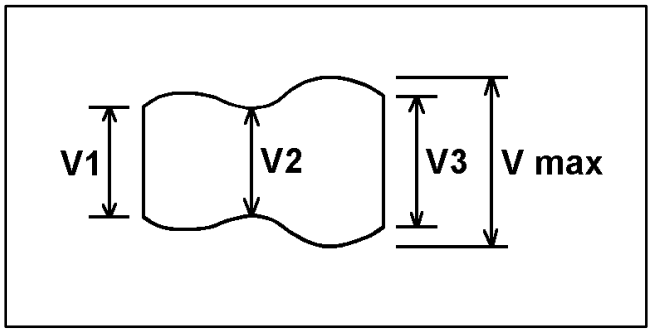
1. Basically this operation should be performed after linearity and waving measurement finished.
2. Select the item “<3> Data Save/Load” on the LISTA main menu, and select the item “<1> Save”.
3. The linearity waveform as Peak Hold displayed on the screen, and after appeared message “File Name?” on the screen. Then entry the File Name less than 8 letters, and after appeared message “Comment?” on the screen. Then entry the Comment less than 20 letters. As comment, entry the Serial Number, Model Number, Head Rotation Hours etc, for use management of linearity data of each VTR and Camera Recorder.
4. After completion of saving, select the item “<2> Load” of the item ”<3> Data Save/Load”, then appear the saved File Name on the screen. And select it previous saved file for confirm the waveform and numerical value displayed correctly. By press “SHIFT” and “ } “ key simultaneously on the Key Board, then display the numerical values of “Linearity” and “Waving” on left lower portion of screen.

3-34. Self-REC/PLAY Envelope Waveform Confirmation

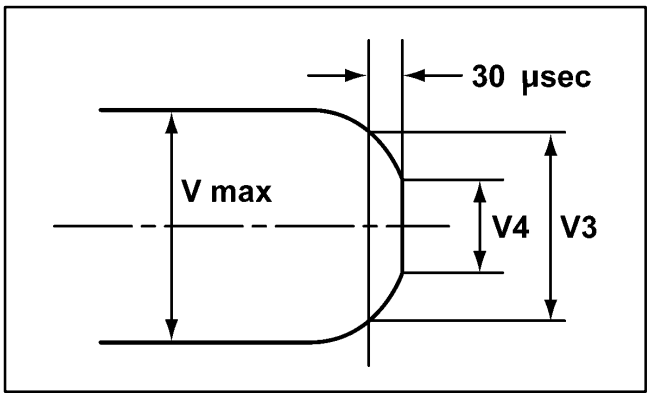
SPEC.	All of the head output are within specification as shown below. Confirm in the 50M mode when your VTR or Camera Recorder is 50M model. · When using the M Cassette (66 min.) or L Cassette (126 min.) V1/Vmax, V3/Vmax ≥ 0.7 V2/Vmax ≥ 0.8 · When using the Long Time L Cassette (correspondence model only) V1/Vmax, V2/Vmax, V3/Vmax ≥ 0.7 V4/Vmax ≥ 0.5
TEST POINT	All R/P Envelope : Refer to item "2. Table of Test Point" All PB Envelope (B type models only) : Refer to item "2. Table of Test Point" • Confirm the all of the channels. • Confirm the PB envelope too about B type models.
M. EQ.	Oscilloscope
TAPE	• M Cassette (66 min.) or L Cassette (126 min.) • Long Time L Cassette (correspondence model only)
TOOL	VFK1149 (Post Driver)

<Classified List>

Type	Models
A	AJ-D200, AJ-D210, AJ-D215, AJ-D400, AJ-D610, AJ-D700, AJ-D700A, AJ-D780, AJ-D800, AJ-D800A, AJ-D810, AJ-D810A, AJ-D90, AJ-D900W, AJ-D900WA, AJ-D910WA, AJ-PD900W, AJ-PD900WA, AJ-DE77
B	AJ-D220, AJ-D230, AJ-D230H, AJ-D250, AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D750, AJ-D850, AJ-D92, AJ-D94, AJ-D95DC, AJ-D940, AJ-D950, AJ-D950A, AJ-LT75, AJ-LT85



1. Input the color bar signal and record it.
2. Playback the just recorded portion, and confirm the envelope output is within specification.
3. If it is out of specification, perform the "ENV Waveform Adjustment" and "LISTA Adjustment" again.



NOTE 1 :
The model of AJ-D90, AJ-D900W, AJ-D900WA, AJ-D910WA, AJ-PD900WA and AJ-PD900WA, which models should be connect to BER COUNTER (refer to item "Envelope Waveform Adjustment").

NOTE 2 :
In case of AJ-D940, setting on Service Menu required. (refer to item 3-11.)

4. No Tape Loading Procedures

[Classified List of DVCPRO VTR for No Tape Loading]

Type	Models
A	AJ-D750, AJ-D850, AJ-D940, AJ-D950, AJ-D950A, AJ-DE77
B	AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D780
C	AJ-LT75, AJ-LT85
D	AJ-D220, AJ-D230, AJ-D230H, AJ-D250
E	AJ-D92, AJ-D94, AJ-D95DC
F	AJ-D200, AJ-D210, AJ-D215, AJ-D400, AJ-D610, AJ-D700, AJ-D700A, AJ-D800, AJ-D800A, AJ-D810, AJ-D810A, AJ-D90, AJ-D900W, AJ-D900WA, AJ-D910WA, AJ-PD900W, AJ-PD900WA

4-1. In case of Model Type A, B, C, D and E

[Procedure]

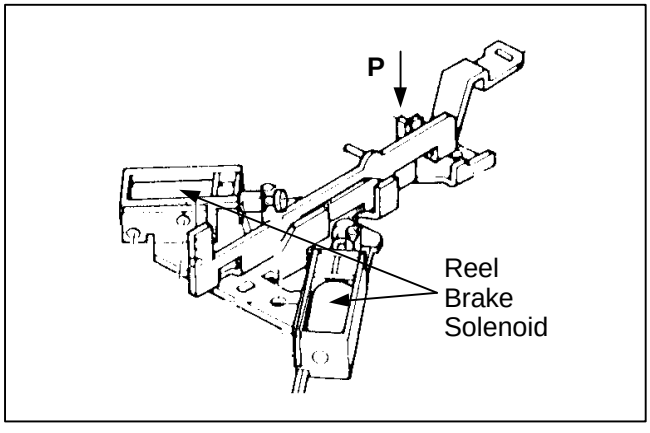
Type	Selected Menu (on Service Menu)	Selected Item	Loading Procedure	Unloading Procedure	Remarks
A	SERVO ADJUST	T TORQUE	Press **SEARCH** button	Press **SEARCH** button	During press SEARCH button, hold the loading condition.
B	SERVO ADJUST	T TORQUE	Press **STOP** button	Press **STOP** button	During press STOP button, hold the loading condition.
C	SERVO ADJUST	T TORQUE	Press **SHIFT** button	Press **SHIFT** button	During press SHIFT button, hold the loading condition.
D	SERVO ADJUST	TENSION OFST	Press **BEGIN** button	Press **BEGIN** button	----------
E	SERVO ADJUST	T TORQUE	Press **MODE** button	Press **SET** button	----------

4-2. In case of Model Type F

[No Tape Loading Procedure]

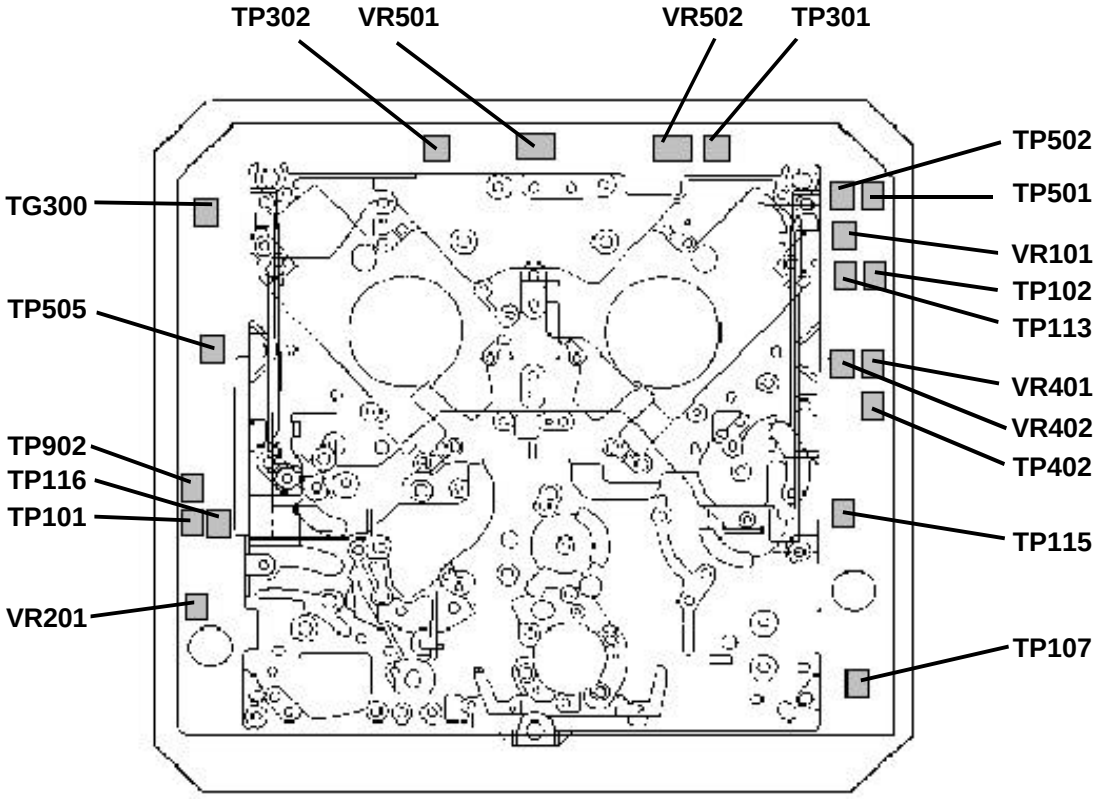
Set the tube to cover the SENSOR LED and press the lever P to place the unit no tape loading mode.

NOTE : Make the tube by yourself.

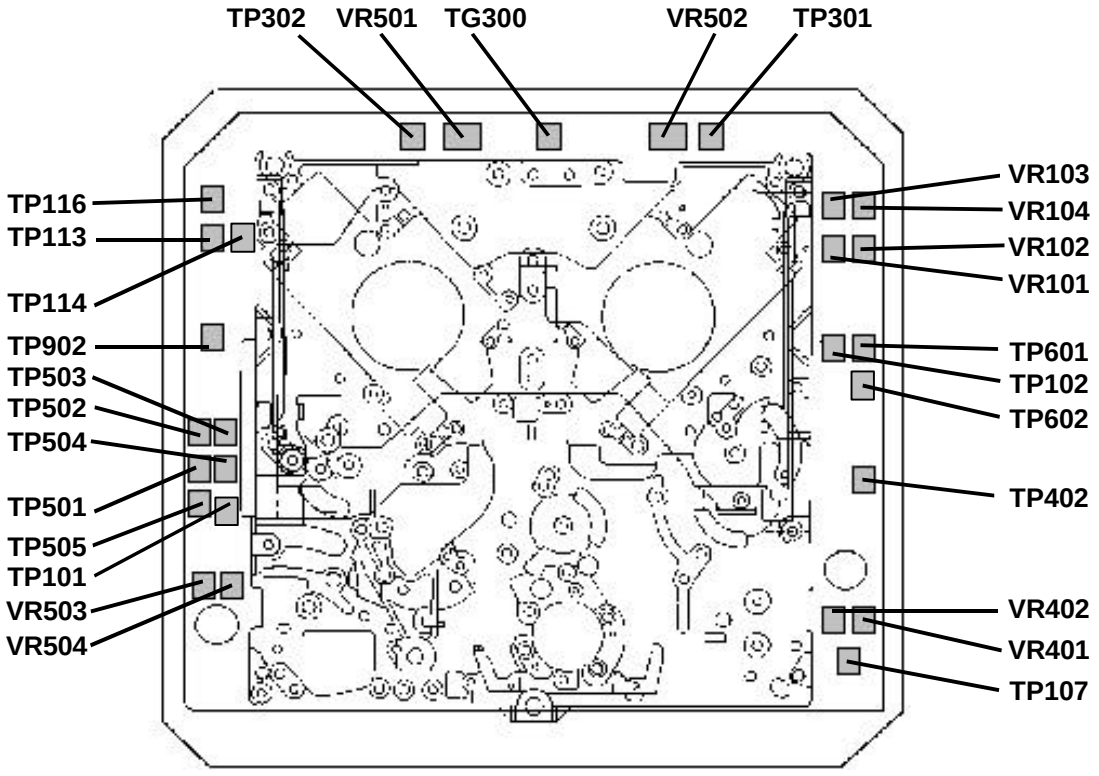


5. Test Point and VR Location for CAMERA RECORDER

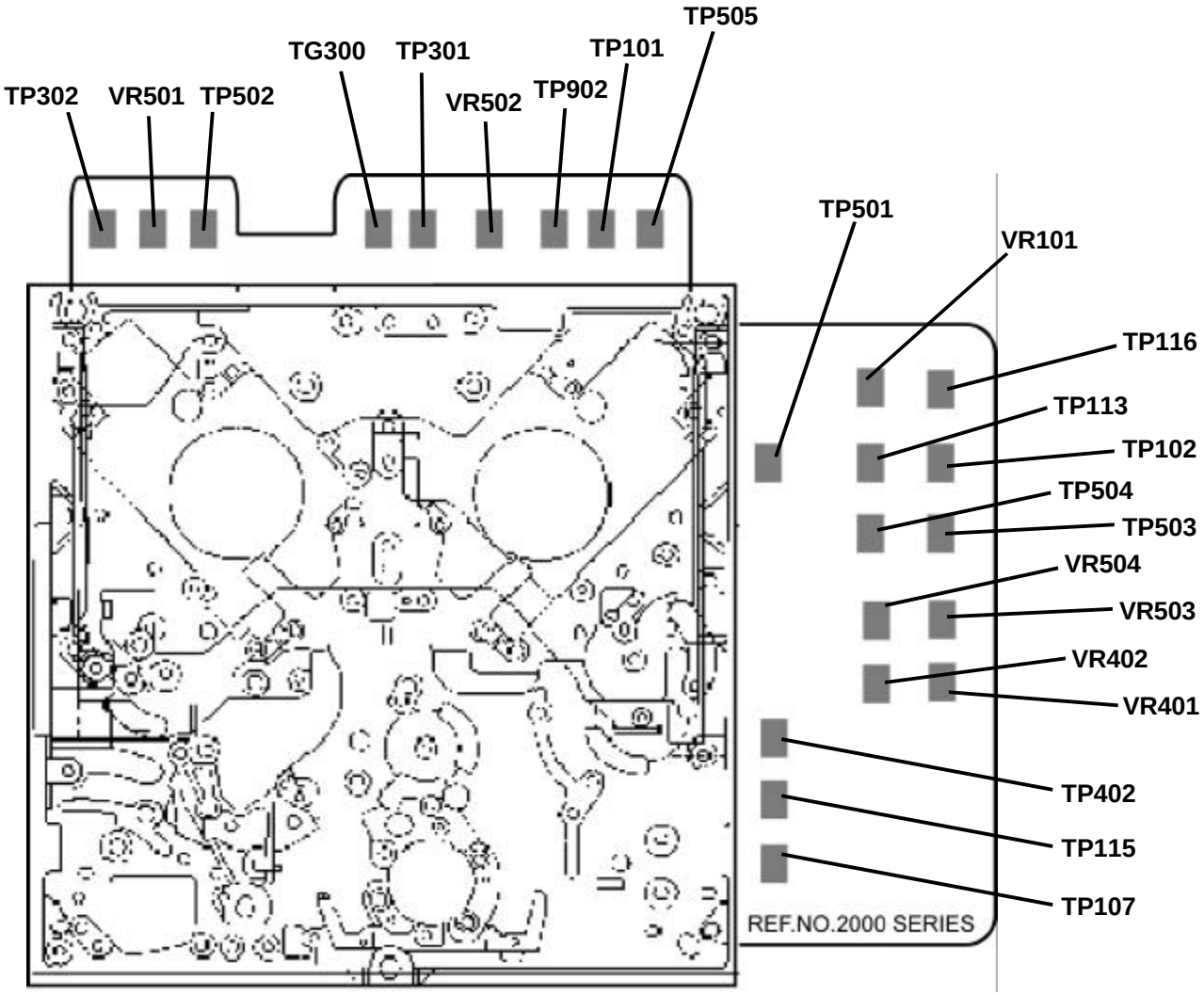
5-1. AJ-D400, AJ-D700 and AJ-D800 Series



5-2. AJ-D90, AJ-D610, AJ-D810, AJ-D900 and AJ-D910 Series



5-3. AJ-D200, AJ-D210 and AJ-D215 Series



SECTION 3

MAJOR MECHANICAL PARTS REPLACEMENT & ADJUSTMENT PROCEDURES

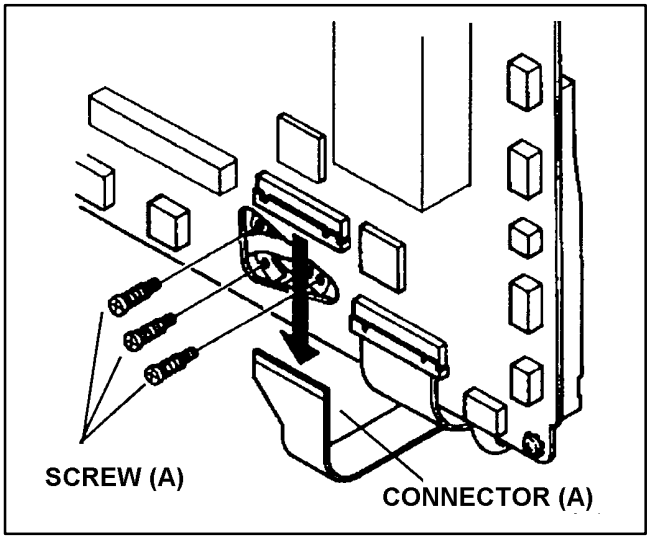
CONTENTS

1. Major Mechanical Parts Replacement & Adjustment Procedures

GENERAL

This procedure is mentioned some name of P.C.Board and connector number. The name of P.C.Board and number of connector are difference each DVCPRO VTR and CAM CODER. Therefore each models classified 4 types as indicated as below table <CHART A>. If the item (1-1 to 1-31) have table <CHART B>, the model No. is discriminated by <CHART A>.

With item of "1-6.Confirmation of Main Brake Torque", is described two difference specification. Please select the specification follow the <CHART C>.



<CHART A>

TYPE A	AJ-D440, AJ-D450, AJ-D640, AJ-D650, AJ-D750, AJ-D780, AJ-D850, AJ-D940, AJ-DE77, AJ-D950, AJ-D950A,
TYPE B	AJ-D220, AJ-D230, AJ-D230H, AJ-D250, AJ-LT75, AJ-LT85, AJ-D95DC, AJ-D92, AJ-D94,
TYPE C	AJ-D400, AJ-D700, AJ-D700A, AJ-D800, AJ-D800A, AJ-D810, AJ-D810A, AJ-D90, AJ-D900W, AJ-PD900W, AJ-D900WA, AJ-PD900WA, AJ-D910WA, AJ-D610,
TYPE D	AJ-D200, AJ-D210, AJ-D215

When mechanical parts are replaced, pay attention to the following notes.

1. Always turn power off before replacing any parts.
2. If any adjustment is required replacing parts, perform the required adjustment.
3. Use proper hard tools of fixtures.
4. Be sure to clean the parts after replacement, also when the mechanical parts are replaced, follow the replacement procedure.

1-1. Cylinder Unit Replacement

<CHART B>

Model Type	TYPE A	TYPE B	TYPE C,D
Connector (A)	P33	P2033	P613
P.C.Board (B)	MECH I/F	SERVO	SERVO

(Removal)

1. Remove the T1 Guide and Cleaning Arm Unit. (Please refer to item “1-2. Cleaning Arm Unit Replacement”)

Figure 1-1-1

2. Unscrew the screw (B) which fix the cable (B) as shown in Figure 1-1-2.
3. Remove the flexible cable which connected to connector (A) on the P.C.Board (B) as shown in 1-1-1.
4. Unscrew the 3 screws which have spring from the Cylinder Unit as shown as Figure 1-1-1, then remove the Cylinder Unit without touching any mechanical parts as shown in Figure 1-1-2.

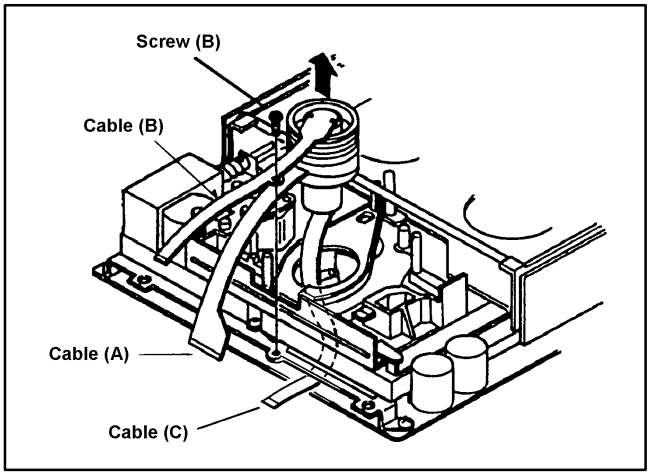


Figure 1-1-2

NOTE:
Never touch the cylinder by finger directly, when pull out the Cylinder Unit.

(Installation)

1. Install the new Cylinder Unit according to the opposite procedures to removing.

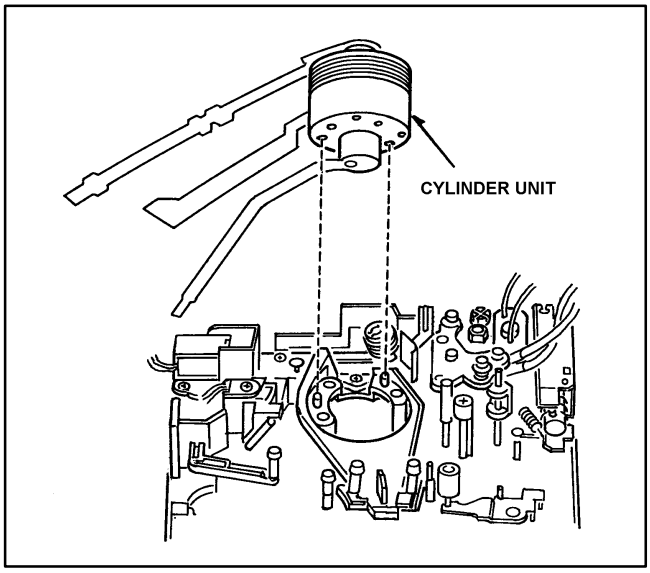


Figure 1-1-3

NOTE:
When installing the Cylinder Unit, the pin on Mech. Chassis should match hole of Cylinder Unit as shown in Figure 1-1-3.

2. After installing the T1 Guide, T1 Guide Position Adjustment should be performed.
   (Please refer to item “1-2. Cleaning Arm Unit Replacement” and “1-3. T1 Guide Position Adjustment”)

1-2. Cleaning Arm Unit Replacement

(Removal)

1. Unscrew the 2 screws (A) and remove the T1 Guide as shown in Figure 1-2.
2. Widen the tip of the cleaner arm, lift up the cleaning arm unit and remove the spring and washer.

(Installation)

1. Install the spring and washer.

2. Cleaning Arm Unit insert temporary to T2 Arm Unit. Install the spring to between Cleaner Base Plate and Cleaning Arm Unit, and insert perfectly Cleaner Arm Unit to T2 Arm Unit.
3. Rotate the cylinder by hand in the pressing the core of the Cleaner Solenoid, and confirm that the Cleaner Roller rotate.
4. Install the T1 Guide.
5. After install the T1 Guide, please perform the item “1-3. T1 Guide Position Adjustment”.

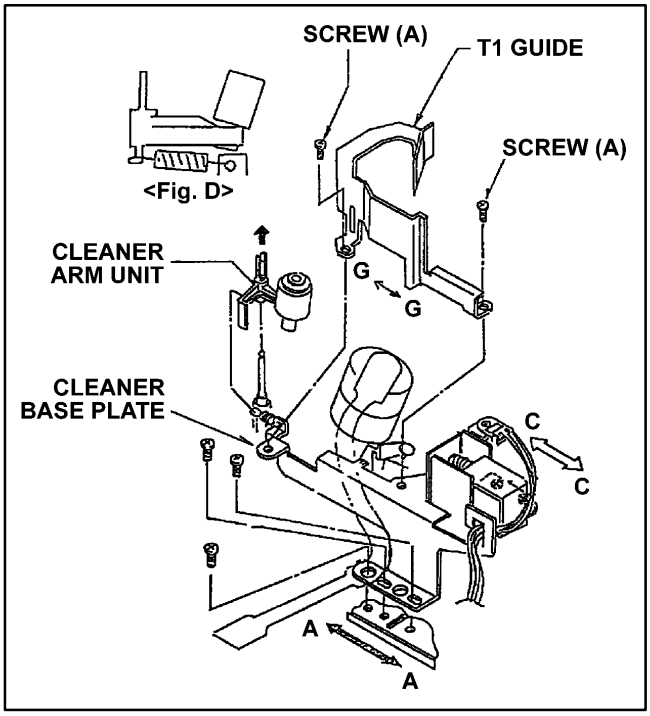


Figure 1-2

1-3. T1 Guide Position Adjustment

1. Place the unit to loading condition without the tape.

NOTE :
Please refer to item “4.No Tape Loading Procedure” on Section 2. And refer to the item No tape loading procedure on the service manual, if the model does not mentioned at Classified list.

2. Observe the clearance (B) between T1 Guide and T1 post as shown in Figure 1-3, and make sure that it is within 0.2mm to 0.5mm.
3. If not, loosen the 2 screws (A) and adjust the position of the T1 Guide moves to direction of arrow (G ←→ G) so that the clearance (B) is within specification. And tighten the 2 screws (A).

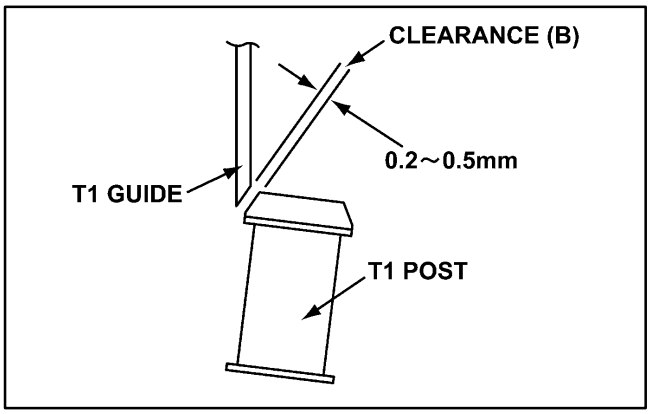


Figure 1-3

1-4. Adjustment Flow Chart after Cylinder Unit Replacement

1. After change the Cylinder Unit, please perform the following flow chart.

START Mechanical Adjustment (Section 2)

↓

3-8. Tension Confirmation

↓

3-11. Envelope Waveform Adjustment

↓

3-12. Post Limit Confirmation (PLAY)

↓

3-16. A/C Head Tilt Confirmation

↓

3-17. A/C Head Height Confirmation

↓

3-18. A/C Head Azimuth & X-value Adjustment

↓

3-19. REV Tape pass confirmation & Adjustment

↓

3-21. CTL Self-Recording Level Confirmation

↓

3-22.Play Tape Pass Limit Confirmation

↓

3-23. Envelope Waveform Confirmation (REV/REW/FF)

↓

3-24. Envelope Rising Confirmation

↓

3-25. & 3-26. Tape Pass Limit Confirmation (REV/REW/FF)

↓

3-27. Screw Lock Tight (A/C Head, T3 & T4 Post)

↓

3-28. Tape Damage Confirmation (Long Play Type)

↓

Note : Envelope level Adjustment

↓

Note : PG Shifter Adjustment

↓

3-29. LISTA Adjustment Procedure

↓

3-30. LISTA Connection and Boot-up

↓

3-32. LISTA Sensitivity Adjustment

↓

3-32. LISTA Sensitivity Detection

↓

3-33. Linearity Adjustment & Waving Measurement

↓

3-34. Self-REC/PLAY ENV Confirmation

↓

START Electrical Adjustment

↓

EQ Adjustment

↓

REC CURR & REC FREQ Adj.

↓

END

NOTE:

Envelope level and PG Shifter adjustment procedure are mentioned on Electrical Adjustment Procedure on Service Manual.

1-5. Supply & Take-up Reel Rotor Unit Replacement (except Camera Recorder)

<CHART B>

Model Type	TYPE A	TYPE B
Connector (A)	P34	P2034
Connector (B)	P35	P2034
P.C.Board (C)	MECH I/F	SERVO

(Removal)

1. Disconnect the **connector (A)** and **(B)** on the **P.C.Board (C)**. (Please refer to above chart.)
2. Move the S1 post to loading direction by manual ejecting method until the screw (C) can removing position as shown in Figure 1-5-1.
3. Confirm the supply and Take Up Brake are not release.
4. Press the iron core of M stopper solenoid to release the M stopper.
5. Remove the 4 screws (C), (D) and (E) as shown in Figure 1-5-1.
6. Remove the Supply and Take Up Reel Rotor Unit and Reel Outer Rail a shown in Figure 1-5-2.

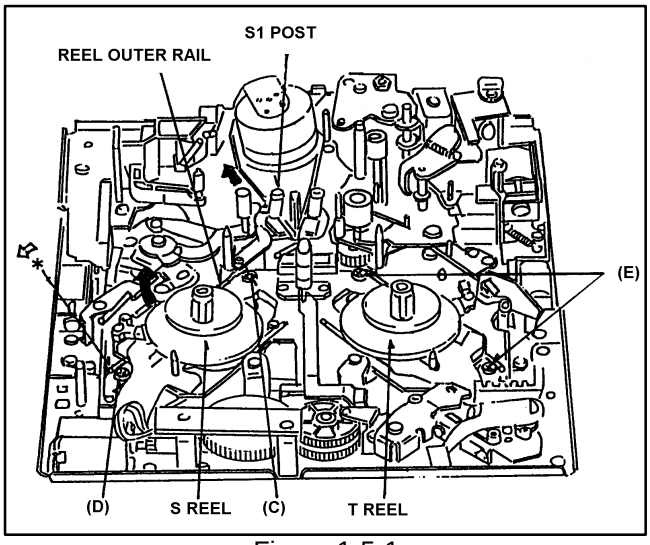


Figure 1-5-1

NOTE:

Memorized the groove position of Reel Base, which inserted the pin of Drive Arm Unit.

(Installation)

1. Through in the Reel Outer Rail to New Supply and Take Up Reel Rotor Unit.
2. Hang on the Reel Rotor Unit to Reel Inner Rail and Install the Reel Rotor Unit then the pin of Drive Arm Unit should be matched with groove position of Reel Base as shown in Figure 1-5-2.
3. Install the 4 screws (C), (D) and (E).
4. Confirm that the Reel Rotor Unit moving smoothly on the Rail by hand.
5. Move the Reel Rotor Unit to front side by hand and then pull up the iron core of M stopper solenoid for operating M stopper.
6. Set the unloading condition by turn the Emergency shaft counter-clockwise.
7. Confirm that the Main Brake Torque.
8. Connect the Flexible Cable to **connector (A)** and **(B)** on the **P.C.Board (C)**.
9. Adjust the S Reel Torque Offset value.
10. Adjust the T Reel Torque Offset value.
11. Adjust the S Reel Motor Torque Offset value.
12. Adjust the T Reel Motor Torque Offset value.
13. Confirm that the Tension value on playback mode.

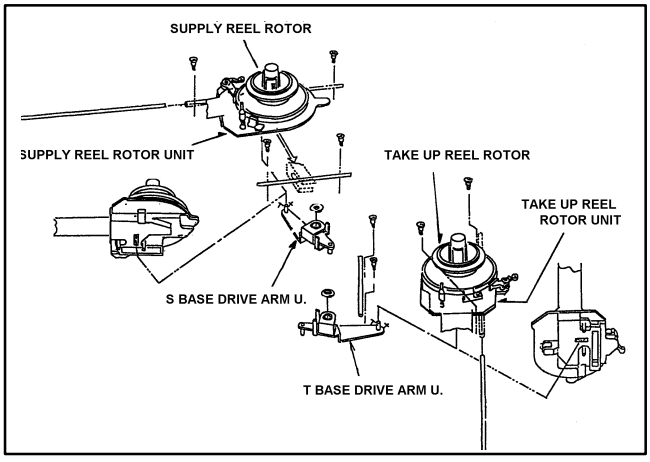


Figure 1-5-2

1-5. Supply & Take-up Reel Rotor Unit Replacement (Camera Recorder only)

<Supply Reel Rotor Unit Replacement>

(Removal)

1. Disconnect the connector P614 on the SERVO P.C.Board.
2. Remove the S5 Post. (Refer to item “1-17”)
3. Pull up the Arm Return Spring on the Connection Arm Angle Side.
4. Remove the Connection Arm Angle.
5. Remove the Cut Washer (A) and (B) to remove the Idler Arm Unit as shown in Figure 1-5-3.
6. Unscrew the 4 screws (C) to remove the Supply Reel Rotor Unit.
7. Unscrew the 2 screws (D) to remove the S-Side M Stopper from Supply Reel Rotor Unit.

CAUTION:

Don’t touch FG portion with the magnetized screw driver , when unscrewing the screw (D).

(Installation)

1. Install the new Supply Reel Rotor Unit according to the opposite procedures to removing.
2. Execute the Reel Torque Offset Adjustment.
3. Adjust the Motor Torque Offset value.
4. Confirm the tape tension on playback mode.

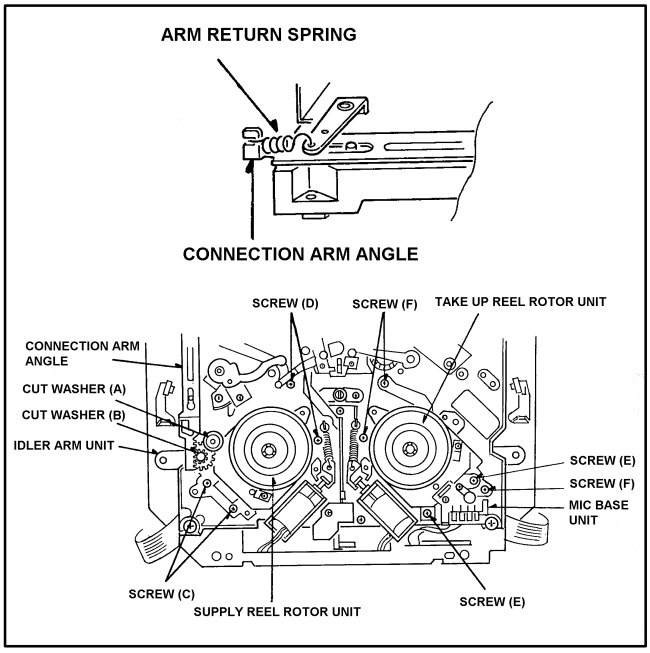


Figure 1-5-3

<Take-up Reel Rotor Unit Replacement>

(Removal)

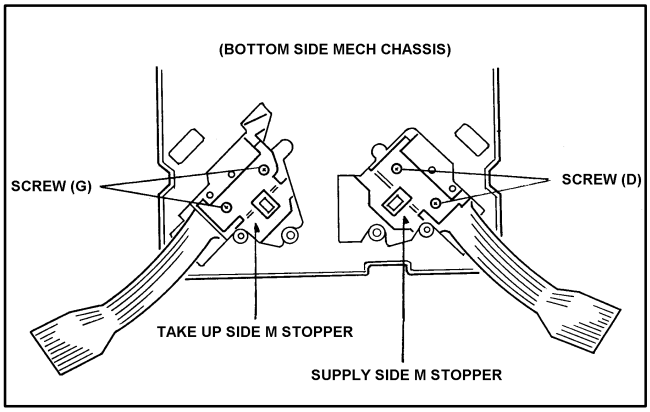
1. Disconnect the connector P615 on the Servo P.C.Board and unscrews the 2 screws (E) ,and then remove the MIC Base Unit as shown in Figure 1-5-3.
2. Unscrew the 3 screws (F) to remove the Take Up Reel Rotor Unit as shown in Figure 1-5-3.
3. Unscrew the 2 screws (G) to remove the T-Side M Stopper from Take Up Reel Rotor Unit as shown in Figure 1-5-3.

CAUTION:

Don’t touch FG portion with the magnetized screw driver when unscrewing the screw (D).

(Installation)

1. Install the new Take Up Reel Rotor Unit according to the opposite procedures to removing.
2. Execute the Reel Torque Offset Adjustment.
3. Adjust the Motor Torque Offset value.



4. Confirm the tape tension on playback mode.

Figure 1-5-4

1-6. Main Brake Torque Confirmation

TEST	S Reel, T Reel
MODE	EJECT (Power OFF)
TOOL	Torque Gauge (VFK71, VFK1191) Torque Gauge Adapter (VFK1152)
ADJUSTMENT SPECIFICATION	
Direction A	
TYPE A	**TYPE B**
3.9mN-m ± 2mN-m (40g-cm ± 20g-cm)	More than 7.8mN-m (more than 80g-cm)
Direction B	
TYPE A	**TYPE B**
2mN-m ± 2mN-m (20g-cm ± 10g-cm)	More than 1.5mN-m (more than 15g-cm)

<CHART C>

TYPE A	AJ-D200, AJ-D210, AJ-D215, AJ-D220, AJ-D230, AJ-D400, AJ-D640, AJ-D650, AJ-D700, AJ-D700A, AJ-D750, AJ-D780, AJ-D800, AJ-D800A, AJ-D810, AJ-D810A, AJ-D90, AJ-D900W, AJ-PD900W, AJ-D900WA, AJ-PD900WA, AJ-D910WA, AJ-D950, AJ-D950A, AJ-DE77, AJ-LT75, AJ-LT85, AJ-D610
TYPE B	AJ-D230H, AJ-D250, AJ-D440, AJ-D450, AJ-D850, AJ-D92 AJ-D940, AJ-D95C, AJ-D94

1. Install the adapter (VFK1152) to the torque gauge (VFK71).
2. Put the torque gauge on S Reel and turn the torque gauge to direction A until S Reel slips against brake.
3. Confirm the torque is within specification.
4. Put the torque gauge on T Reel and turn the torque gauge to direction A until T Reel slips against brake.
5. Confirm the torque is within specification.
6. Install the adapter (VFK1152) to the torque gauge (VFK1191).
7. Put the torque gauge on S Reel and turn the torque gauge to direction B until S Reel slips against brake.
8. Confirm the torque is within specification.
9. Put the torque gauge on T Reel and turn the torque gauge to direction B until T Reel slips against brake.
10. Confirm the torque is within specification.

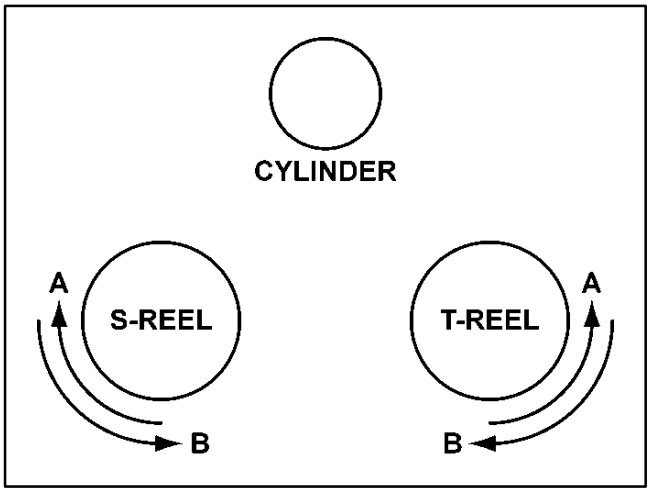


Figure 1-6

1-7. Supply & Take-up Brake Arm Unit Replacement (except Camera Recorder)

(Removal)

1. Press the iron core of Brake Solenoid for release the Brake.
2. Remove the cut washers (A) and remove the supply and Take Up Brake Arm Unit as shown in Figure 1-7.

(Installation)

1. When install the new Brake Arm Unit first, hang on the Brake Arm Spring as shown in Figure 1-7.
2. Follow the previous steps in reverse order.
3. Execute the Main Brake Torque confirmation.

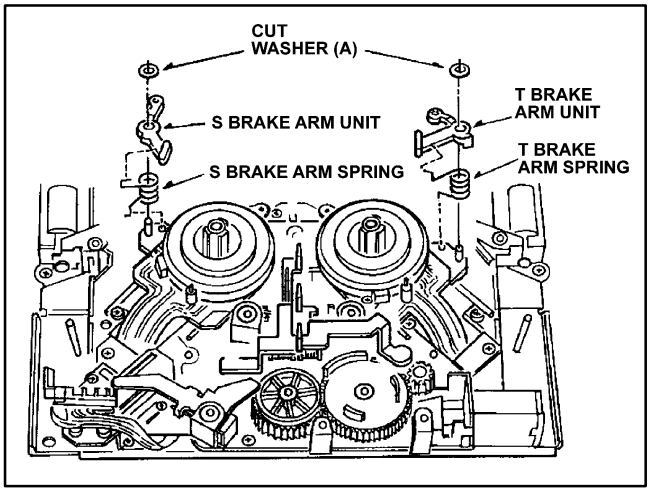


Figure. 1-7

1-8. Supply Brake Solenoid Replacement and Adjustment (except Camera Recorder)

<CHART B>

Model Type	TYPE A	TYPE B
Connector (A)	P15	P2015
P.C.Board (B)	MECH I/F	SERVO

(Removal)

1. Disconnect the **connector (A)** on the **P.C.Board (B)**. (Refer to above chart.)
2. Unscrew the 2 screws (A) and remove the Supply Brake Solenoid Base Unit as shown in Figure 1-8-1.
3. Unscrew the 2 screws (B) and remove the supply Brake Solenoid from Supply Brake Solenoid Base Unit as shown in Figure 1-8-1.

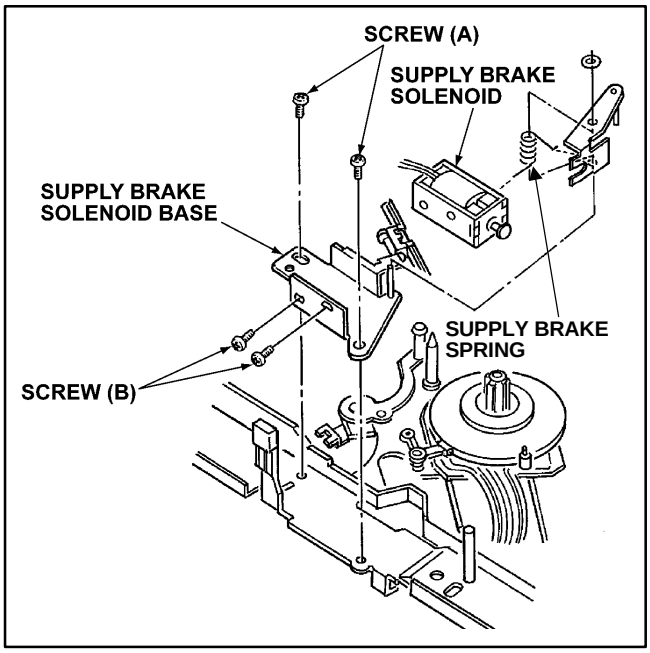


Figure. 1-8-1

(Installation)

1. Install the new supply Brake Solenoid follow the removal steps in reverse order.

NOTE :

Hang on the Brake Arm Spring as shown in Figure 1-8-1.

2. After installing, execute the position adjustment as following procedures.

(Adjustment Procedures)

1. Place the reels in the M cassette size position.
2. Observe the clearance (A) between Brake pad and it's turntable as shown in Figure 1-8-2. And make sure that it is within 0.2 to 0.5mm.
3. If not, loosen the 2 screws (A), which fixed supply and Take Up Brake Solenoid Unit. And adjust the position of Brake Solenoid Unit by moving arrow direction so that the clearance (A) is within specification. And tighten the 2 screws (A).
4. After adjustment, change the reel position to S and L cassette size, and confirm that the clearance (A) is within specification.

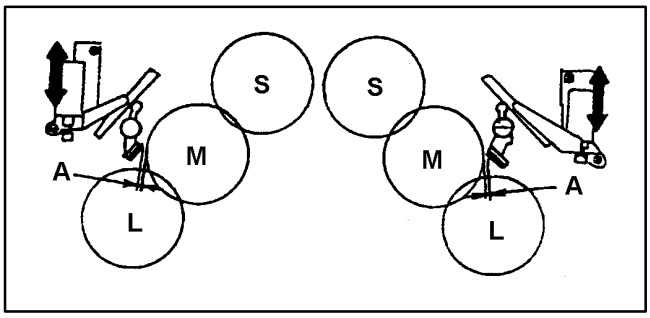


Figure 1-8-2

1-9. Take-up Brake Solenoid Replacement and Adjustment (except Camera Recorder)

<CHART B>

Model Type	TYPE A	TYPE B
Connector (A)	P15	P2015
P.C.Board (B)	MECH I/F	SERVO

(Removal)

1. Disconnect the **connector (A)** on the **P.C.Board (B)**. (Refer to above chart.)
2. Unscrew the 2 screws (A) and remove the Take Up Brake Solenoid Base Unit as shown in Figure 1-9.
3. Unscrew the 2 screws (B) and remove the Take Up Brake Solenoid from Take Up Brake Solenoid Base Unit as shown in Figure 1-9.

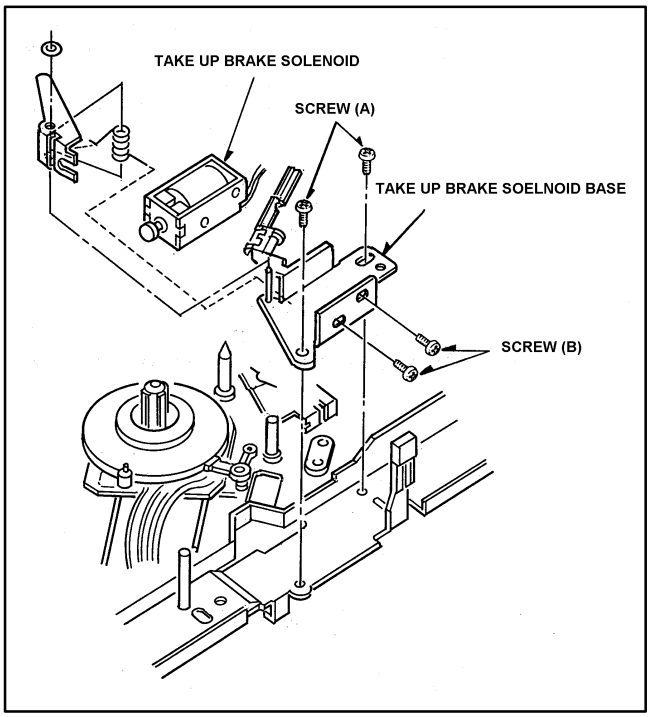


Figure 1-9

(Installation)

1. Install the new Take up Brake Solenoid follow the removal steps in reverse order.

Note:

Hang on the Take up Brake Spring as shown in Figure 1-9.

2. After installation, position adjustment should be performed as follows.

(Adjustment Procedures)

1. Please adjust the position of Take up Brake Solenoid Unit follow the adjustment procedure, which is described item “1-8. Supply Brake Solenoid Replacement and Adjustment”.

1-10. Pinch Solenoid Replacement

CHART B

Model Type	TYPE A	TYPE B	TYPE C,D
Connector (A)	P20	P2020	P610
P.C.Board (B)	MECH I/F	SERVO	SERVO

(Removal)

1. Disconnect the **connector (A)** on the **P.C.Board (B)**. (Refer to above chart)
2. Unscrew the 2 screws (A) and remove the Pinch Solenoid Unit as shown in Figure 1-10.
3. Unscrew the 2 screws (B) and remove the Pinch Solenoid Angle as shown in Figure 1-10.
4. Unscrew the 2 screws (C) and remove the Pinch Solenoid from the Pinch Solenoid Base.

(Installation)

1. Install the new Pinch Solenoid follow the removal steps in reverse order.
2. After installation, execute the Pinch Solenoid Position Adjustment.

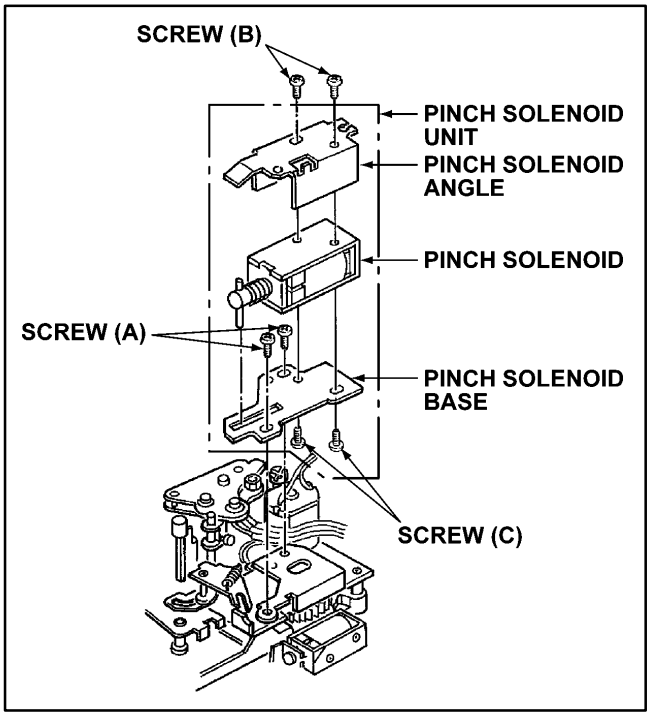


Figure 1-10

1-11. Pinch Solenoid Position Adjustment

SPEC.	T = 0.3 mm
TEST	Gap T
ADJUST	Screw (A) and Hole (B)
MODE	EJECT (Power OFF)
TOOL	Eccentric Driver (VFK0357)

1. Confirm the power of condition at VTR turn to OFF.
2. Push the pinch roller by hand to be close to capstan.
3. Push the pinch solenoid by hand so that the pinch roller contacts capstan.
4. Loosen the two screws (A) and adjust the hole (B) by VFK0357 so that gap (T) is within specification.
5. The position for confirm Gap, which is located spring scratch to Plate (C) side.

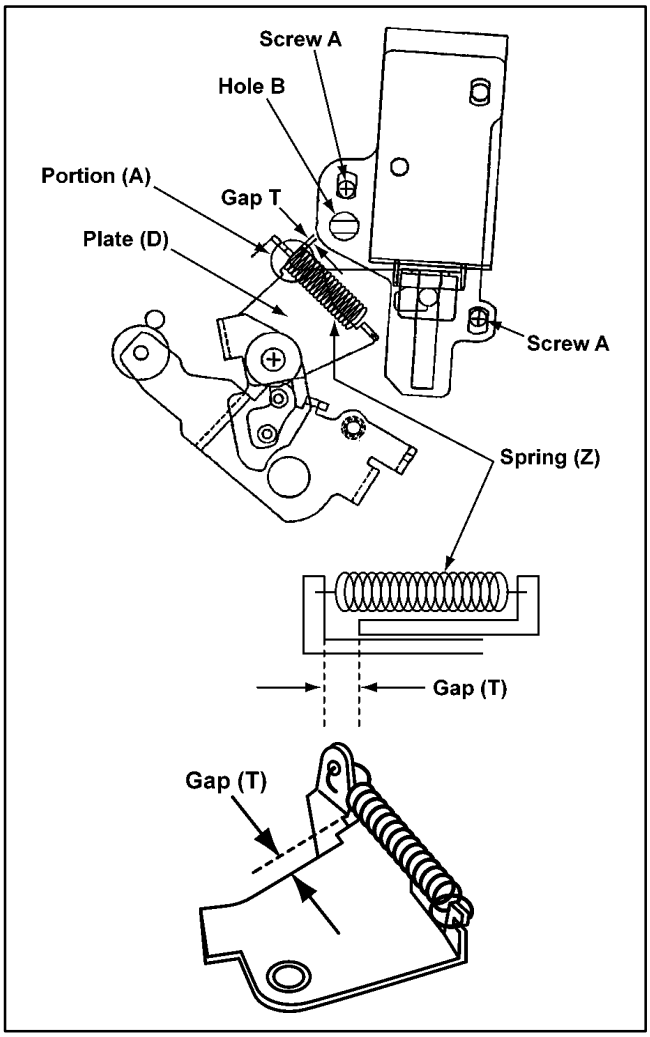


Figure 1-11

1-12.Pinch Arm Unit Replacement

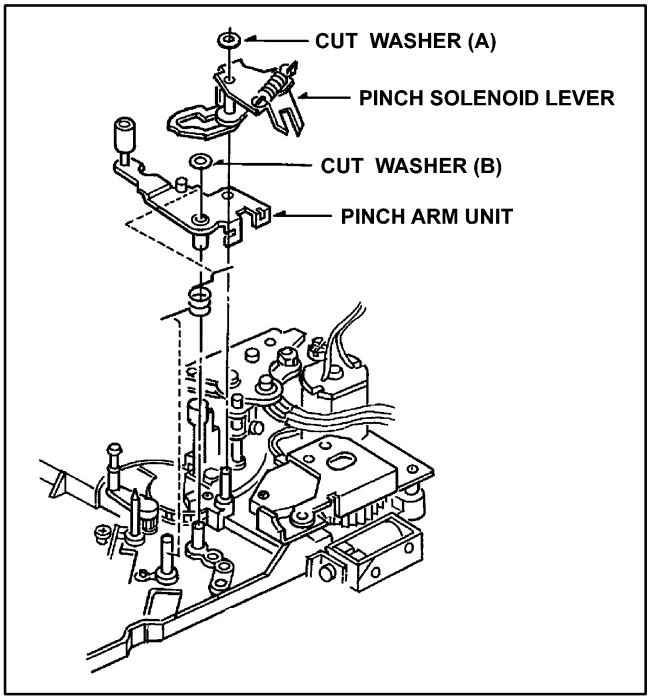
(Removal)

1. Remove the Pinch Solenoid Unit as refer to item "1-10.Pinch Solenoid Replacement".
2. Remove the cut washer (A) and remove the Pinch Solenoid Lever as shown in Figure 1-12.
3. Remove the cut washer (B) and remove the Pinch Arm Unit as shown in Figure 1-12.

(Installation)

1. Install the new Pinch Arm Unit follow the removal steps in reverse order, and then Pinch Solenoid Position Adjustment is necessary.

Figure 1-12



1-13. Loading Motor Replacement

CHART B

Model Type	TYPE A	TYPE B	TYPE C,D
Connector (A)	P21	P2021	P611
P.C.Board (B)	MECH I/F	SERVO	SERVO

(Removal)

1. Disconnect the **connector (A)** on the **P.C.Board (B)**.
2. Remove the Pinch Solenoid Unit. (Refer to item 1-10).
3. Unscrew the screw (B), and remove the Emergency Shaft as shown in Figure 1-13.
4. Unscrew the 2 screws (C) and remove the Loading Motor Neutral Unit as shown in Figure 1-13.
5. Unscrew the 2 screws (D) and remove the Loading Motor Unit as shown in Figure 1-13.

(Installation)

1. Install the new Loading Motor Unit to Loading Motor Neutral Unit by tightening 2 screws (D).
2. Install the Loading Motor Neutral Unit by tightening the 2 screws (C), then be careful that the pin of Mode SW Unit should be matched to groove position of main Cam Gear.
3. Install the Emergency Shaft by tightening the screw (B).
4. Install the Pinch Solenoid Unit and after installation it, Pinch Solenoid Position adjustment is required. (Refer to item 1-11).
5. Connect the **Connector (A)** to the **P.C.Board (B)**.

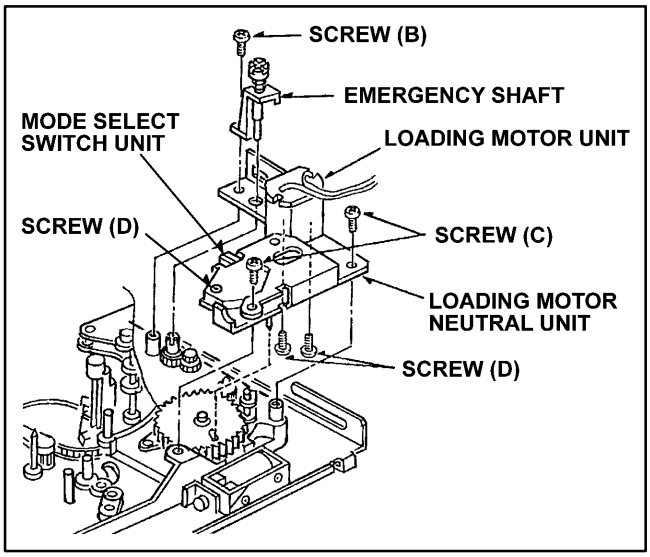


Figure 1-13

1-14. Mode SW Unit Replacement

CHART B

Model Type	TYPE A	TYPE B	TYPE C,D
Connector (A)	P22	P2022	P612
P.C.Board (B)	MECH I/F	SERVO	SERVO

(Removal)

1. Disconnect the **connector (A)** on the **P.C.Board (B)**.
2. Remove the Pinch Solenoid Unit and Loading Motor Unit. (Refer to item 1-10 and 1-13.)
3. Remove the screw (D) and remove the Mode Select Switch Unit from Loading Motor Unit as shown in Figure 1-14.

Note:

Be careful the pin of Mode Switch Unit should be matched to groove of Main Cam Gear.

(Installation)

1. Install the New Mode Select Switch Unit follow the removal steps in reverse order (Refer to item "1-13. Loading Motor Unit Replacement").

2. After install the Pinch Solenoid Unit, Pinch Solenoid Position adjustment is required. (Refer to item 1-11).

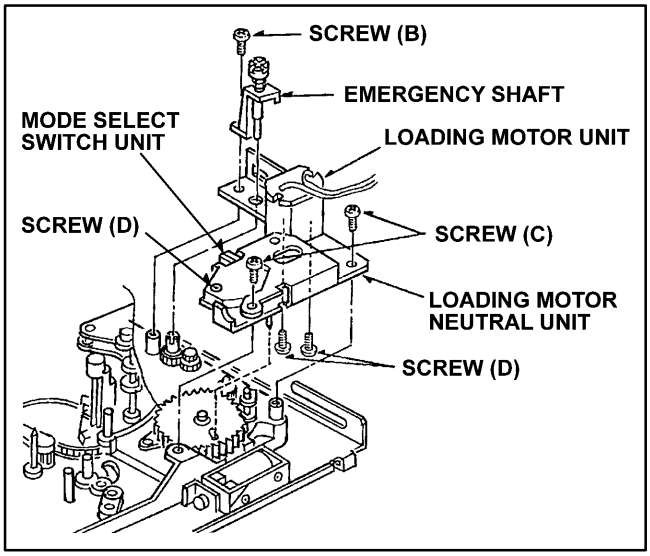


Figure 1-14

1-15. Main Cam Gear Replacement

(Removal)

1. Remove the Pinch Solenoid Unit and Loading Motor Unit. (Refer to item 1-10 and 1-13.)
2. Remove the Main Cam Gear as shown in Figure 1-15.

(Installation)

1. Install the Main Cam Gear, then the pin of Main Cam Arm Unit (*) should be matched with the groove position of Main Cam Gear as shown in Figure 1-15.
2. Follow the removal steps in reverse order.
3. After installation, execute the Pinch Solenoid Position Adjustment. (Refer to item 1-11)

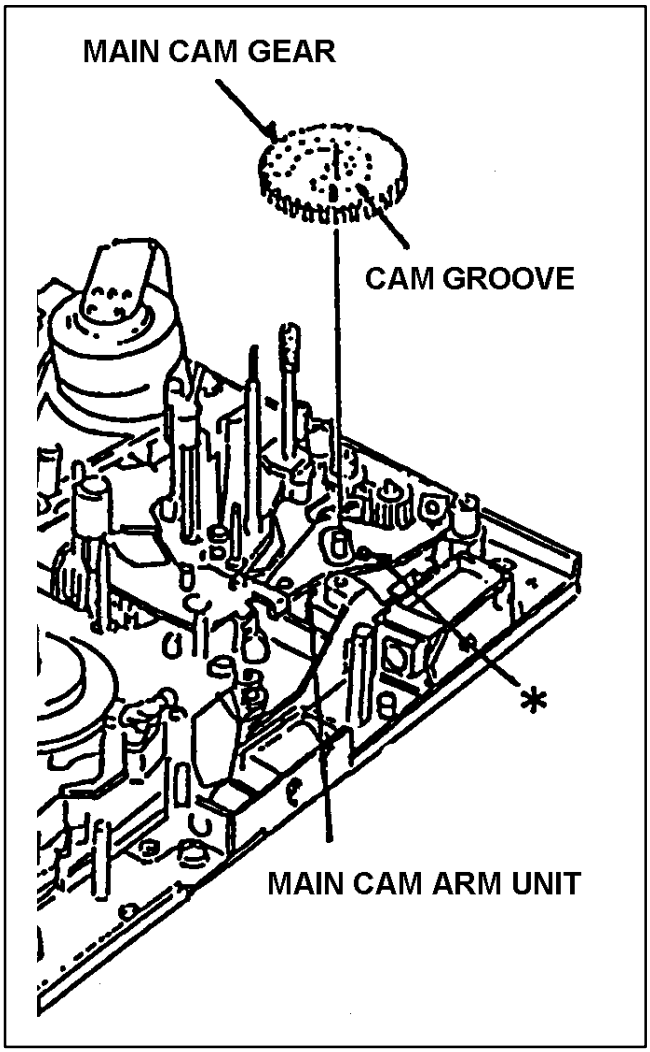


Figure 1-15

1-16. Thrust Screw Replacement and Adjustment

1. Remove the Thrust Adjustment Screw.
2. Enforce cleaning of point department of capstan shaft with an applicator.
3. Put the oil (VFK0906) on a new Thrust Adjustment Screw and install the upper end of the Capstan Housing.
4. Turn the Thrust Adjustment Screw slowly to counter-clockwise until the Capstan Rotor just starts turning (separate from the Capstan Rotor).
5. Turn the Trust Adjustment Screw an another angle of 270 degrees from 180 degrees (about 225 degrees) clockwise as shown in Figure 1-16-2.
6. Put the glue (Ex. : Three Bond 1401B) on the Thrust Adjust Screw.
7. Confirm whether the Oil Seal does not come in contact with the Capstan Housing.

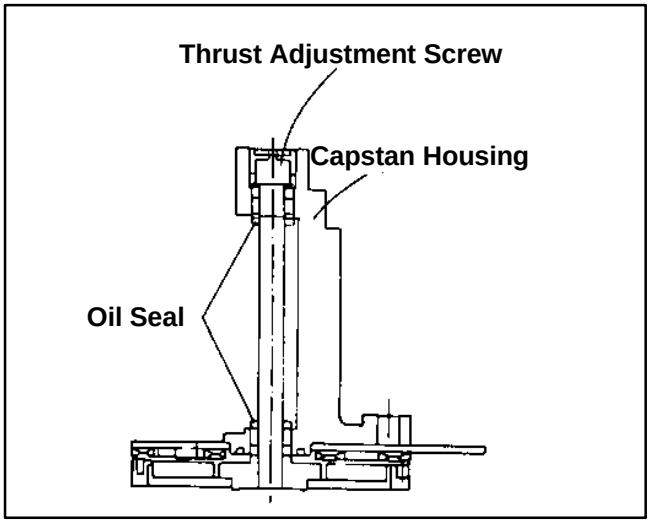


Figure 1-16-1

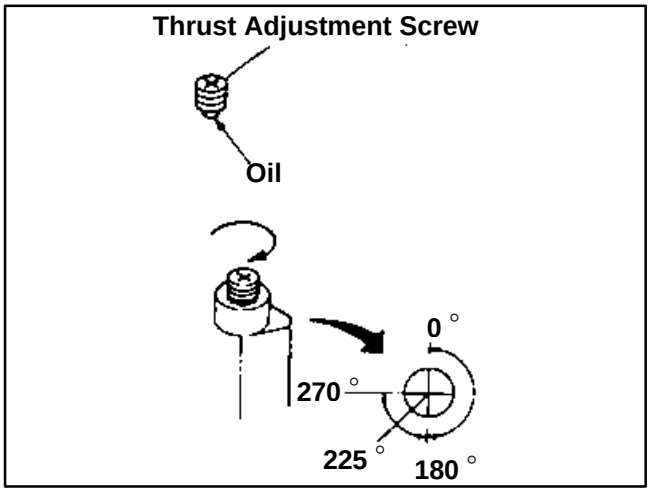


Figure 1-16-2

1-17. S5 Post Base Unit Replacement

(Removal)

1. Unscrew the screw (A) and remove the S5 Post Base Unit as shown in Figure 1-17.

(Installation)

1. Install the S5 post Base Unit follow the removal steps in reverse order.

Note: Be careful the S5 Post Base Unit is install to mech. chassis as shown in Figure 1-17.

2. After installation, Post Height Pre-Adjustment and Tape pass Adjustment should be performed.

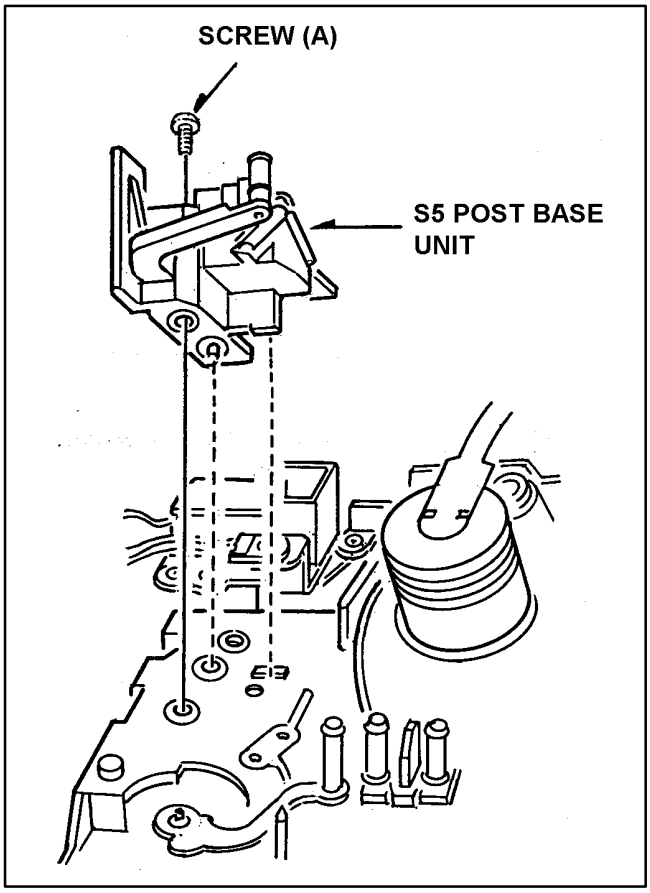


Figure 1-17

1-18. Tension Arm Unit Replacement

(Removal)

1. Remove the Cut Washer (A) and hang off the Tension Regulator Spring, and then remove the Tension Arm Unit as shown in Figure 1-18.

(Installation)

1. Install the new Tension Arm Unit follow the removal steps in reveres order.
2. After installation, Tension Arm Adjustment should be performed the following steps.

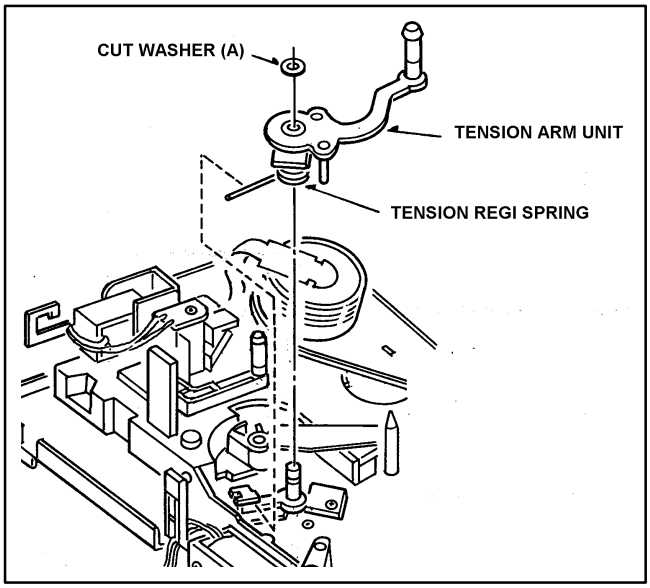
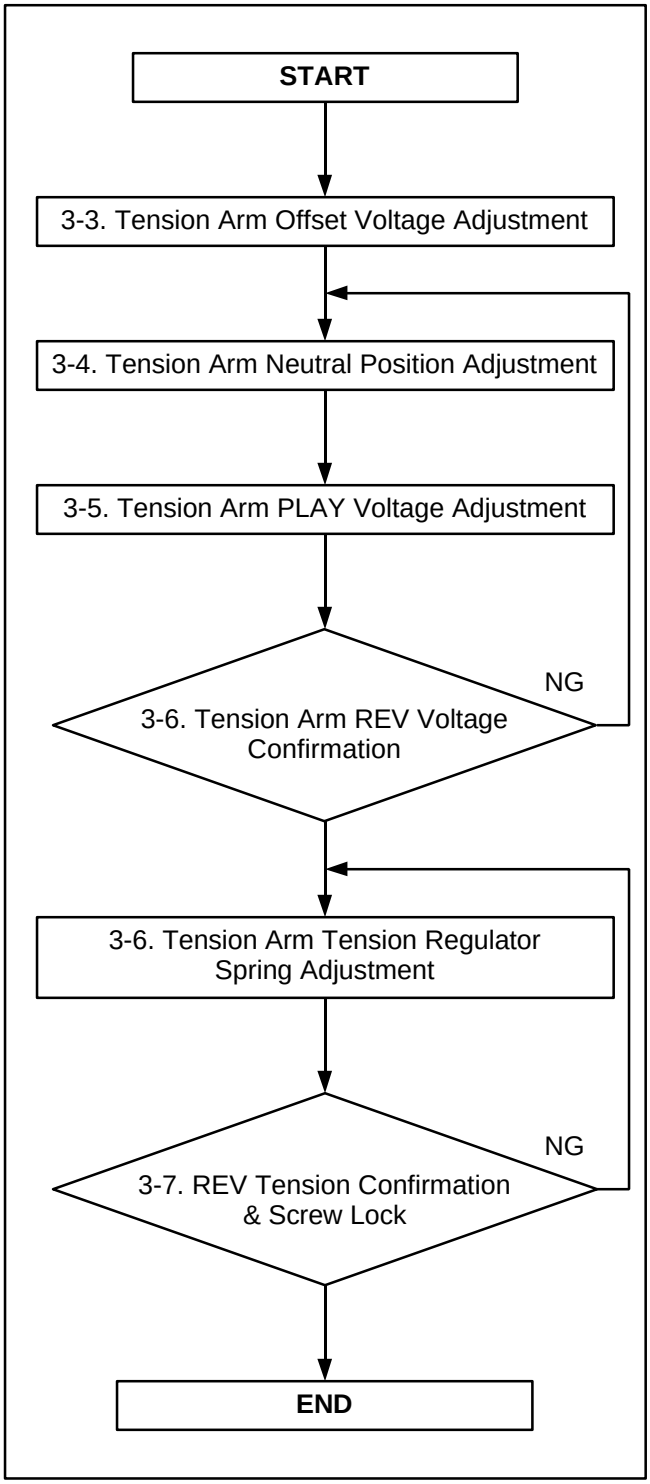


Figure 1-18

<Tension Arm Adjustment Flow Chart>



1-19. S1 Post Loading Arm Unit Replacement & Adjustment

(Removal)

1. Remove the S5 Post Base Unit. (Refer to item 1-17)
2. Remove the Tension Arm Unit. (Refer to item 1-18).
3. Unscrew the screw (A) and remove the S1 Post from Loading Rail as shown in Figure 1-19.
4. Remove the Cut Washer (B) and remove the S1 Loading Arm Unit as shown in Figure 1-19.

(Installation)

1. Install the new S1 Loading Arm Unit follow the removal steps in reverse order, and then S1 Post Loading Arm Unit Phase Adjustment should be performed as follows.
2. After installation, confirm that the S1 Post moving smoothly on the Loading Rail.
3. Tension Arm and Tape pass Adjustment should be performed.

(Adjustment)

Install and adjust so that the Hole (A) is to be parallel with Hole (B) as shown in Figure 1-19.

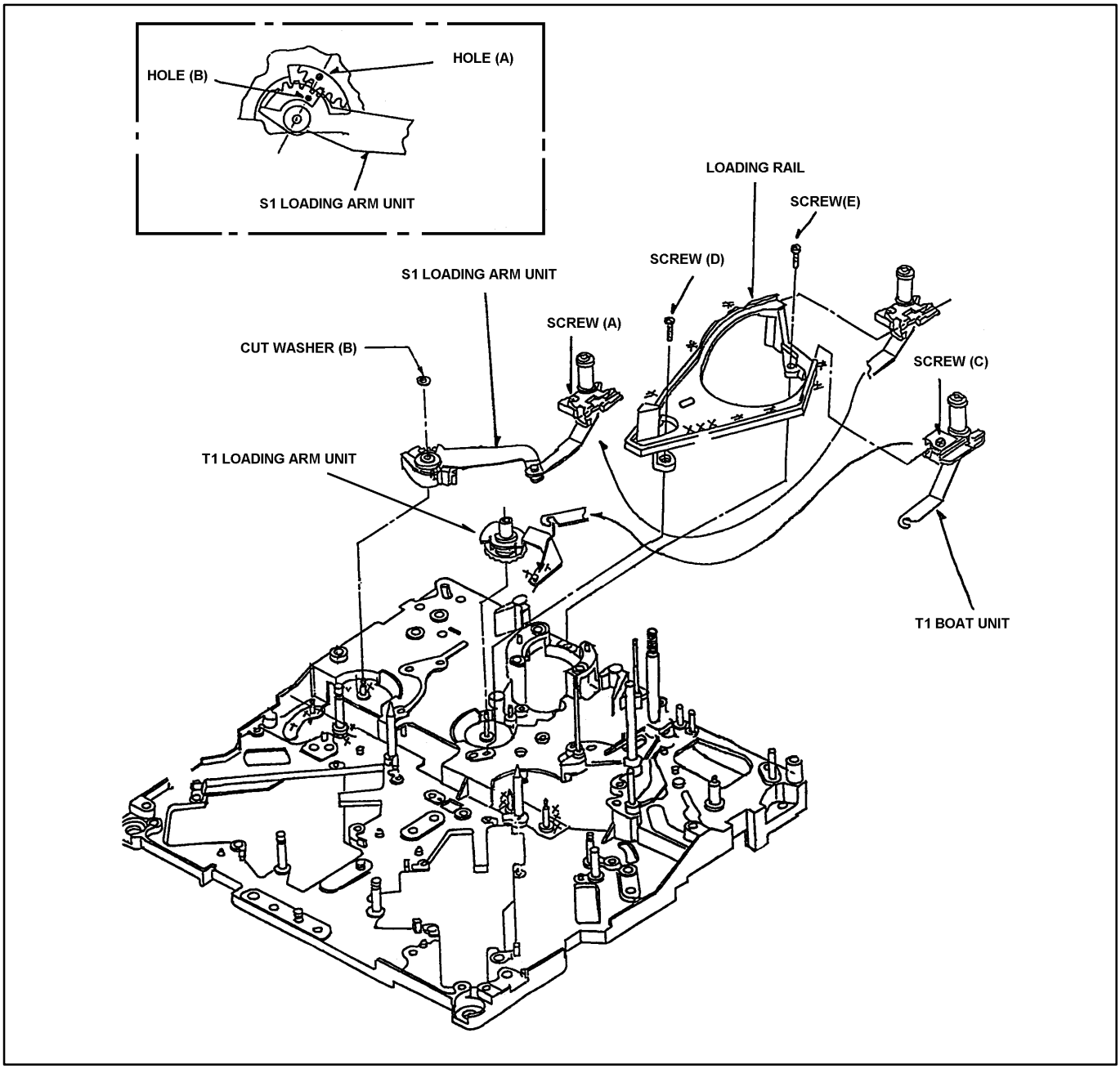


Figure 1-19

1-20. T1 Boat Unit Replacement

(Removal)

1. Unscrew the screw (C) and remove the T1 Post from Loading Rail as shown in Figure 1-19 on the above page.
2. Hang off the T1 Boat Unit from T1 Loading Arm Unit as shown in Figure 1-19.

(Installation)

1. Install the new T1 Boat Unit follow the removal steps in reverse order.
2. After installation, confirm that the T1 Post moving smoothly on the Loading Rail.
3. Tape pass Adjustment should be performed.

(Know how for Replacing T1 boat)

(1) T1 boat replacing procedure

Fix the T1 boat flat to the T loading arm N ass'y with minimum bending of the T1 boat arm.

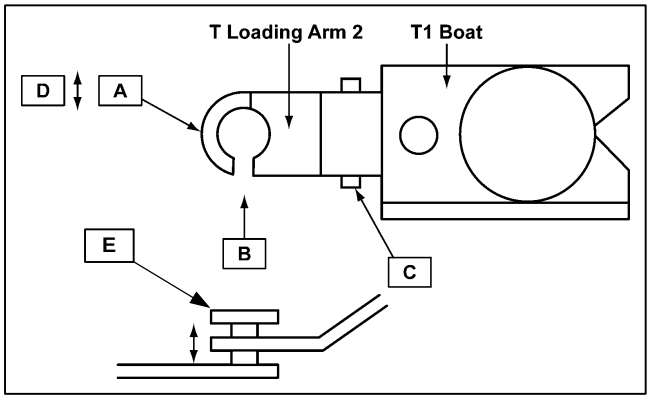


Figure 1-20-1

- If the portion A shown in the figure above is deformed , the T1 boat can cause snag during loading or significant change in X-Value. Visually check the portion A for deformation.
- If deformation is found, remove the T1 boat, flatten the arm by using an appropriate tool such as a pair of long nose pliers and then install the T1 boat. Or, replace the arm with a new one.
- If the portion B shown in the figure above is significantly deformed, the arm can become loose. At a half load position, while pinching the portion C of the arm with tweezers, slightly move the arm in the directions of D shown in the figure several times and make sure that the arm does not come off. If it can come off, remove the T1 boat. Using long nose pliers, narrow the opening B and then fit the T1 boat.

(Confirmation and Adjustment Procedure)

Tool : T Arm Height Adj. Tool A (VFK1542)
T Arm Height Adj. Tool B (VFK1543)

(1) T1 boat replacing procedure

1. Turn clockwise emergency red screw and set the hole of T1 Boat Unit to match line of take up side cassette fixed pin as shown in figure 1-20-2.
2. Push the Pinch Roller by hand to be close to Capstan and push the Pinch Solenoid by hand so that the Pinch Roller contacts Capstan.
3. Set the T Arm Height Adj. Tool A (VFK1452) to take up side cassette fixed pin as shown in figure 1-20-3.
4. Turn the Tool A and confirm that the Tool A is contact to pin E (the position of pin E as shown in figure 1-20-1) as shown in figure 1-20-3.
5. Set the T Arm Height Adj. Tool B (VFK1543) to take up side cassette fixed pin as shown in figure 1-20-3.
6. Turn the Tool B and confirm that the Tool B is not contact to pin E (the position of pin E as shown in figure 1-20-1) as shown in figure 1-20-3.

<Specification of T Arm Height>

	Contact of Pin E
Tool A (have cut)	contact
Tool B (have not cut)	no contact

Note 1 : In case of Tool A does not contact to Pin E.

1. Remove the T1 Boat Unit from Loading Rail and press up the T Loading Arm 1 by hand for change the height of T Loading Arm.
2. Install the T1 Boat Unit and hit the Pin E from the top lightly.
3. Repeat the T1 Loading Arm Height Adjustment.

Note 2 : In case of Tool B is contact to Pin E.

1. Remove the T1 Boat Unit from Loading Rail and press down the T Loading Arm 1 by hand for change the height of T Loading Arm.
2. Install the T1 Boat Unit and hit the Pin E from the top lightly.
3. Repeat the T1 Loading Arm Height Adjustment.

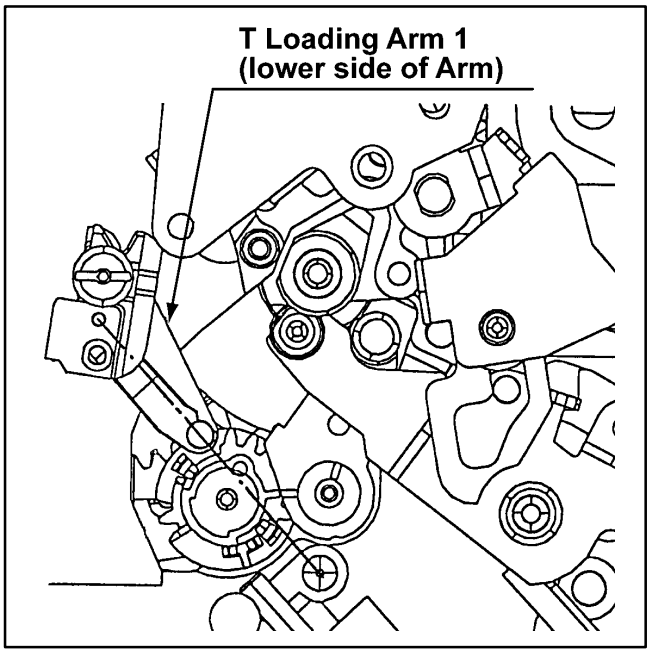


Figure 1-20-2

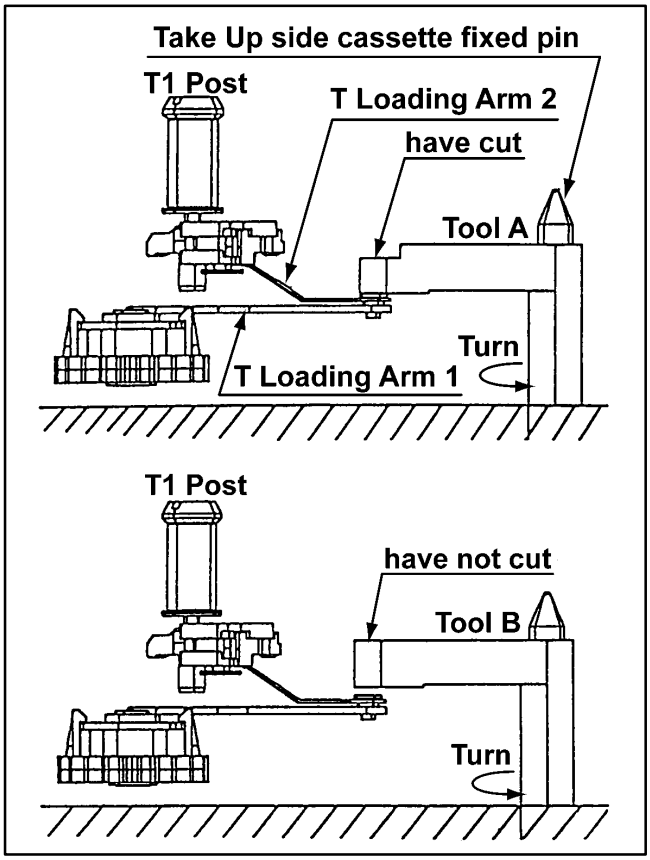


Figure 1-20-3

(2) Checking for smooth movement of T1 Boat Unit.
Check X-Value. Check for smooth loading and unloading operations. If not smooth (especially, at curve of rail), take the following steps.

1. Check T1 boat joint for deformation.
2. If no deformation, then reposition the loading rail as describe below.

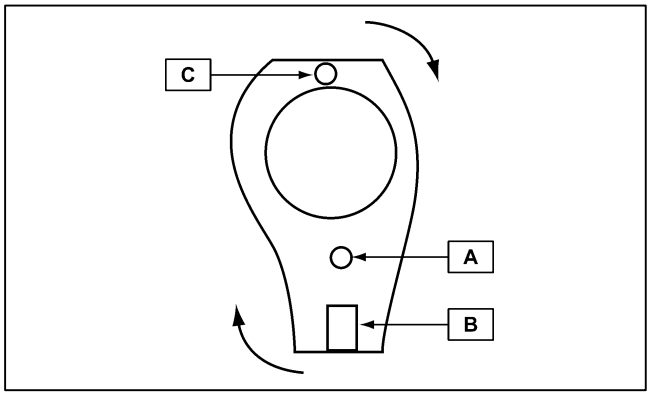


Figure 1-20-4

1. Loosen the screw A.
2. While pressing the projection B leftward, tighten the screw.

If operation is not smooth, remove CYL and loosen screws A and C. Turn the rail clockwise as shown in the figure and then tighten the screws.

If the rail does not work well, replace it or the T1 boat with a new one.

1-21. T1 Loading Arm Unit Replacement & Adjustment

(Removal)

1. Remove the cylinder Unit. (Refer to item 1-1)
2. Move the T1 Post to loading direction by manual ejecting method until the screw (D) can be removal position as shown in Figure 1-19.
3. Unscrew the 2 screws (A) and (C), then remove the S1 and T1 Post from Loading Rail as shown in Figure 1-19.
4. Unscrew the 2 screws (D) and (E), then remove the Loading Rail as shown in Figure 1-19.
5. Remove the T1 Loading Arm Unit as shown in Figure 1-19.

(Installation)

1. Install the T1 Loading Arm Unit follow the removal steps in reverse order, then Phase Adjustment should be performed as follows.

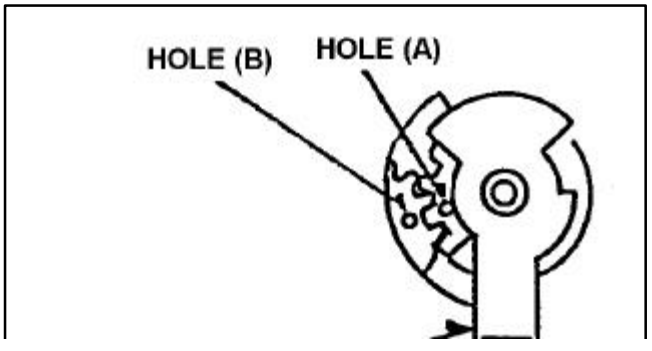
(Adjustment)

1. When install the T1 Loading Arm Unit, then the hole (A) should be matched hole (B) as shown in Figure 1-19.
2. After installation, confirm that the S1 and T1 Post moving smoothly on the Loading Rail.
3. Perform the T1 Loading Arm Height Adjustment. (Refer to previous item)
4. After perform the height adjustment, execute the Post Height Pre-Adjustment and Tape pass Adjustment.

Note:

This replacement should be performed simultaneously, replacement of Cylinder Unit. It is convenience for Replacement of T1 Loading Arm Unit.

Figure 1-21



1-22. M-Cassette Brake Base Unit Replacement (Camera Recorder only)

(Removal)

1. Disconnect the all connectors on Servo P.C.Board. Unscrew the 4 screws (A) to remove the Servo P.C.Board as shown in Figure 1-22.
2. Unscrew the screw (A) to remove the Cassette Down Photo Unit.
3. Unscrew the screw (B) to remove the M-Lock/Release Piece Unit.
4. Unscrew the 2 screws (C) to remove the M cassette Brake Base Unit. Then pick up the pin of Eject Arm Unit.

(Installation)

1. Install the new cassette Brake Base Unit according to the opposite procedures to removing.

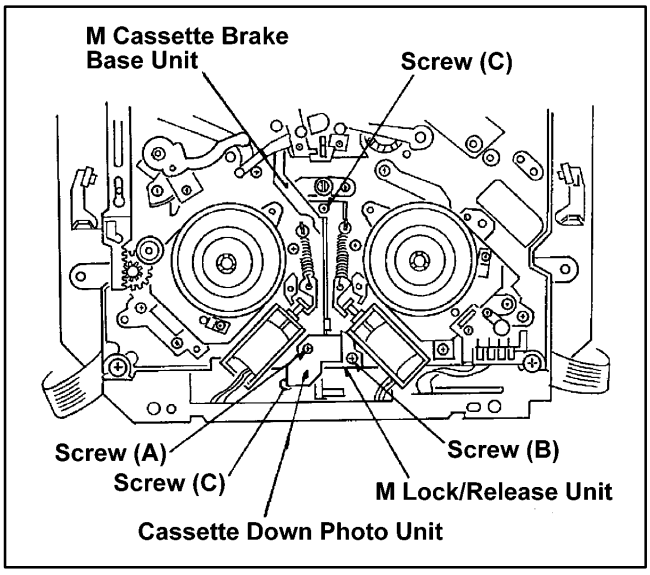


Figure 1-22

1-23. A/C head Replacement & Adjustment

<Tools required>

Nut Driver (5.5mm : VFK1150)
Hex Driver (VFK1148)
Hex Wrench (VFK1190)

<CHART B>

Model Type	TYPE A	TYPE B
Connector (A)	P4002	P4502
P.C.Board (B)	CUE	AUDIO
Connector (C)	P4003	P2030
P.C.Board (D)	CUE	SERVO
Model Type	**TYPE C**	**TYPE D**
Connector (A)	P600	P600
P.C.Board (B)	SERVO	SERVO
Connector (C)	P1003	P1005
P.C.Board (D)	REAR JACK	REAR JACK

(Removal)

1. Loosen the hex screw (B) and remove the Nut (C). Hang off the Head Height Adjustment Spring and then remove the A/C Head Unit as shown in Figure 1-23-1.

Point:

Memorized height of the Nut (C) before remove the Nut (C).

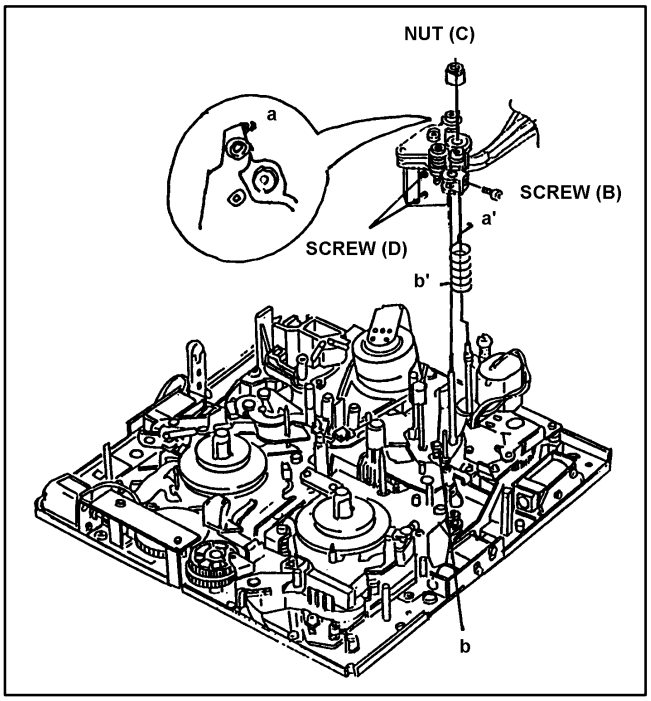


Figure 1-23-1

3. Remove the 2 screws (A) and disconnect the **connector (A)** on the **P.C.Board (B)** and **connector (C)** on the **P.C.Board (D)**, and then remove the A/C Head from the A/C Head Plate as shown in Figure 1-23-2.

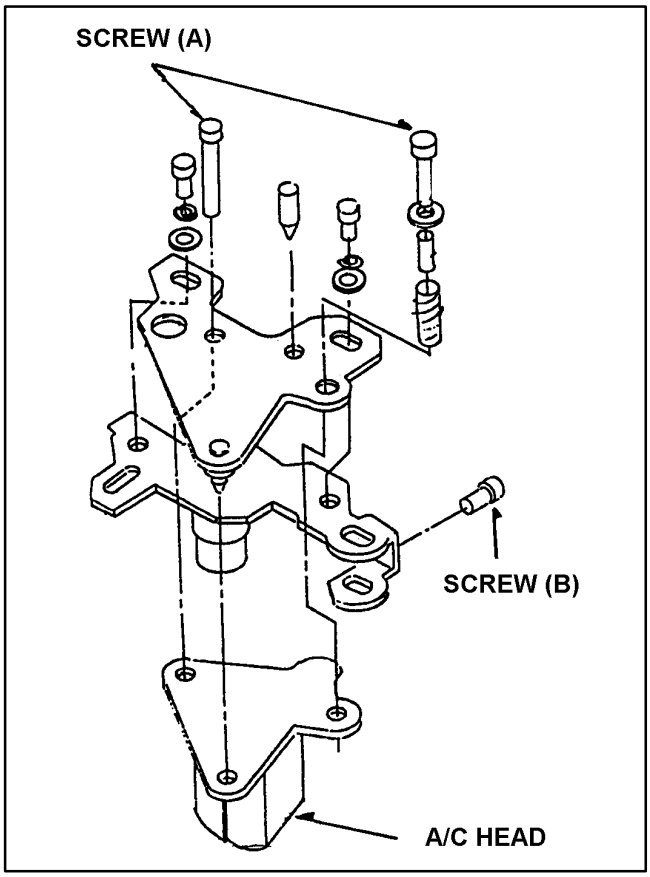


Figure 1-23-2

4. Remove the Shield Cover by removing 2 screws (D).
5. Unsolder the lead wires as shown in Figure 1-23-3. (When unsolder the lead wires, do not unsolder all at the same time)

(Installation)

1. Remove the Shield Case from the New A/C Head and solder the lead wires to New A/C Head. (Refer to Figure 1-23-3)
2. Reinstall the shield case to A/C Head.
3. Install the A/C Head to A/C Head Plate by tight 2 screws (A), then set to parallel the gap between A/C Head and A/C Head Plate.
4. Install the A/C Head Unit.
5. Hang on the Head Height Adjustment Spring and tighten the Nut (C).
6. Clean the surface of the A/C Head.

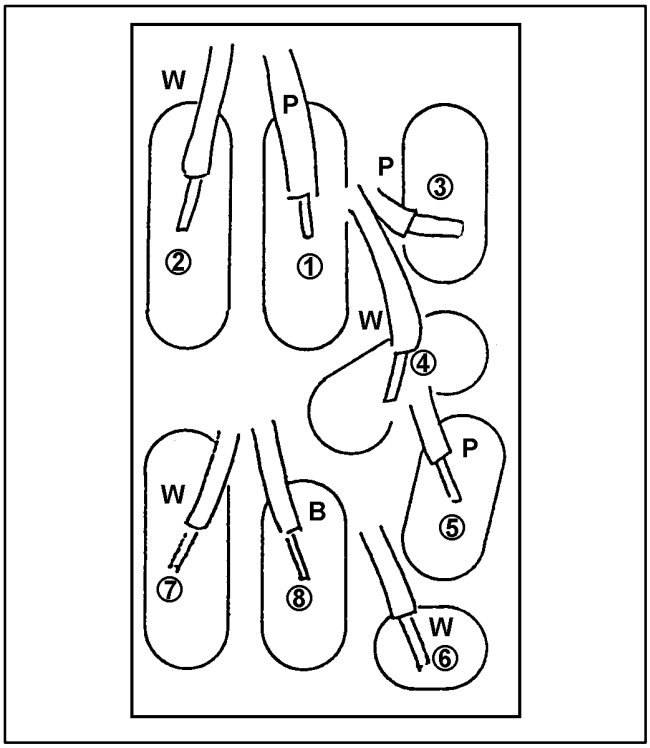
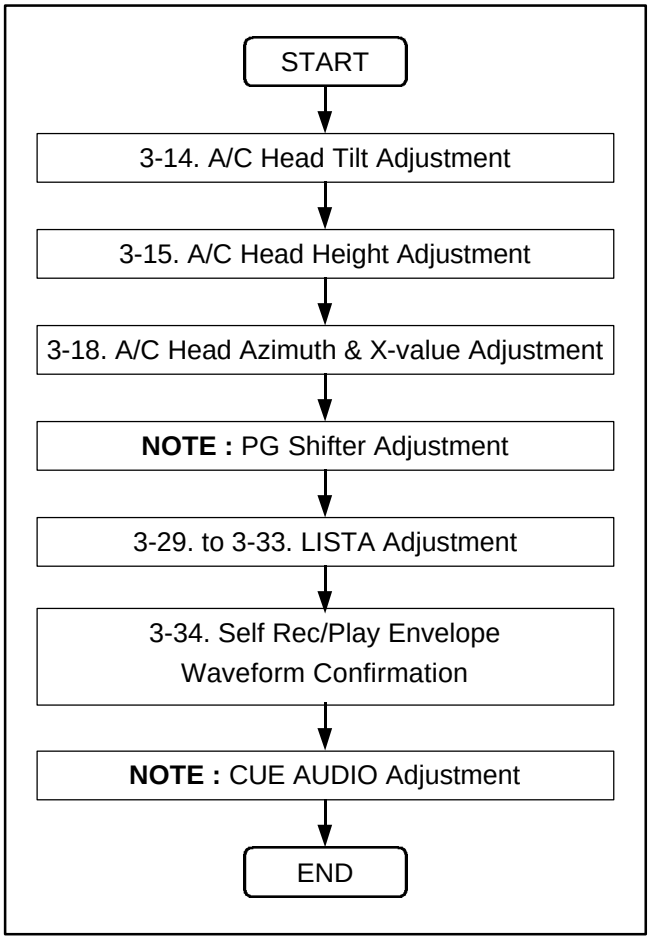


Figure 1-23-3

A/C Head	Cable Color		Connector
1	Pink	Yellow	P1
2	White		
3	Pink	Red	
4	White		
5	Pink	Green	
6	White		
7	White	Yellow	P30
8	Black		

<A/C Head Adjustment>

1. After change the A/C Head, please perform the following steps.



NOTE :

PG Shifter and CUE AUDIO adjustment procedures are mentioned on Electrical Adjustment Procedures on Service Manual.

1-24. Cleaner Solenoid Replacement & Adjustment

<CHART B>

Model Type	TYPE A	TYPE B	TYPE C,D
Connector (A)	P11	P2011	P618
P.C.Board (B)	MECH I/F	SERVO	SERVO

(Removal)

1. Disconnect the **connector (A)** on the **P.C.Board (B)**. (Refer to above charts.)
2. Unscrew the 2 screws (A) and remove the Cleaner Solenoid Unit as shown in Figure 1-24.
3. Unscrew the 2 screws (B) and remove the Cleaner Solenoid as shown in Figure 1-24.

(Installation)

1. Install the new Cleaner Solenoid follow the removal steps in reverse order.
2. After installation, execute the Cleaner Solenoid Position adjustment.

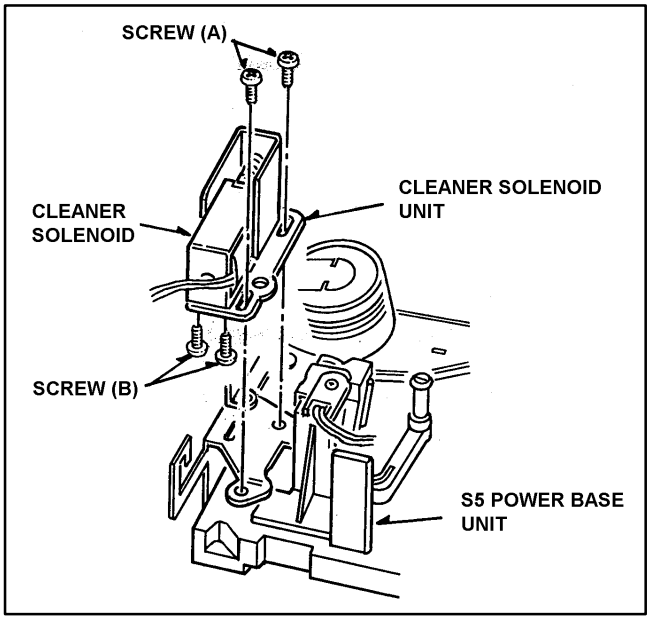


Figure 1-24-1

1-24-1. Cleaner Solenoid Position Adjustment

<Tools required>

Eccentric Driver (VFK0357)

1. Press the iron core of Cleaner Solenoid.
2. Observe the clearance (D) between Cleaning Arm Unit and Cleaner Base Plate as shown in Figure 1-24-2. And make sure that it is within 0.5 to 0.7mm.
3. If not, loosen the 2 screws (A) and adjust the position of Cleaner Solenoid Unit by moving arrow direction (C ←→ C) using the Eccentric drive so that the clearance (D) is within specification. And tighten the 2 screws.
4. After adjustment, confirm that as follow.
5. Press the iron core of Cleaner Solenoid and released it, then the Cleaning Roller is return to original position.
6. Press the iron core of the Cleaner Solenoid and confirm that the Cleaner Roller is rotated, when the Cylinder is rotated by hand.

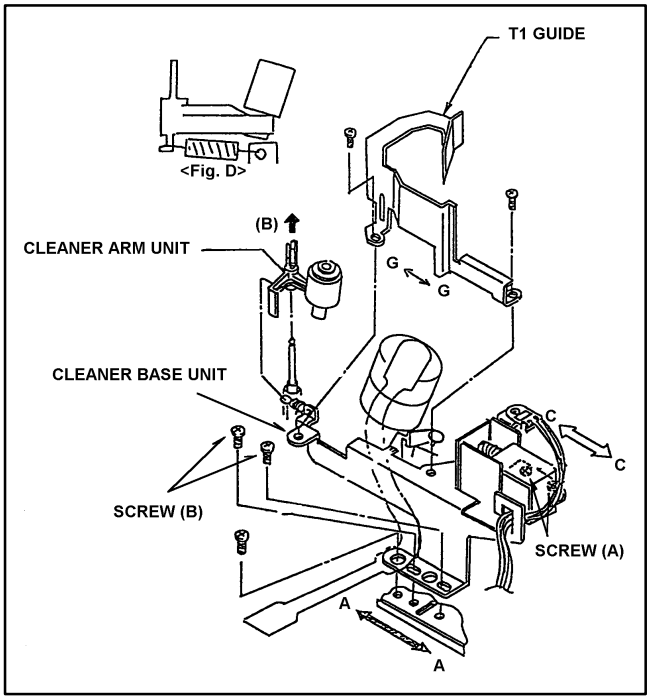


Figure 1-24-2

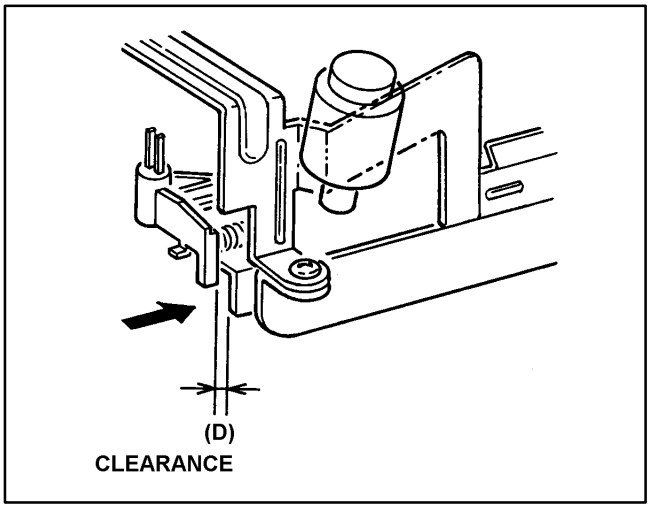


Figure 1-24-3

Note:
If remove the cleaner Base Plate, execute the Cleaner roller Position adjustment.

1-24-2. Cleaner Roller Position Adjustment

<Tools required>
Eccentric Driver (VFK0357)

1. Observe the clearance (A) between Cleaner Roller and cylinder Unit as shown in Figure 1-24-4. And make sure that it is within 1.0 to 1.2mm.
2. If not, loosen the 2 screws (B) and adjust the position of Cleaner Base Plate by moving arrow direction (A ←→ A) using the Eccentric driver so that the clearance (A) is within specification. And tighten the 2 screws (B).

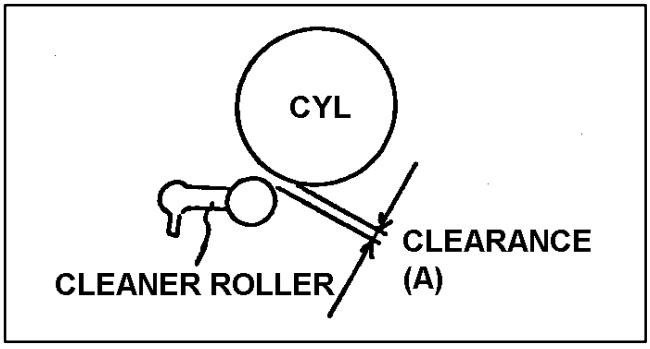


Figure 1-24-4

1-25. Distinction SW Unit Replacement (except Camera Recorder)

<CHART B>

Model Type	TYPE A	TYPE B
Connector (A)	P17	P2017
P.C.Board (B)	MECH I/F	SERVO

(Removal)
1. Disconnect the **connector (A)** on the **P.C.Board (B)**. (Refer to above charts.)
2. Remove the MIC Drive Rev Spring at Distinction Switch Unit side as shown in Figure 1-25.
3. Unscrew the 3 screws (A) and remove the MIC Rail Unit as shown in Figure 1-25.

(Installation)
1. Install the new Distinction Switch Unit follow the removal steps in reverse order.
2. Confirm that the M and L cassettes touch to Distinction Switch Unit correctly.

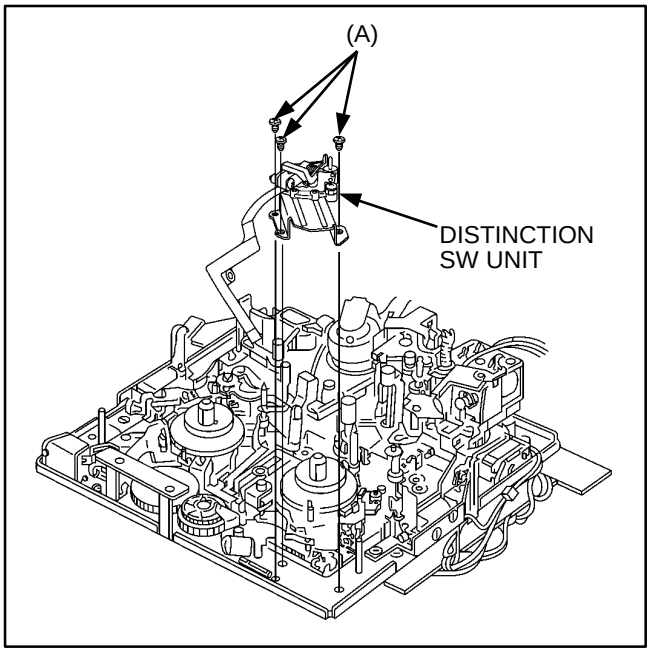


Figure 1-25

1-26. MIC Base Unit Replacement (Camera Recorder only)

(Removal)

1. Disconnect the connector P607 on the Servo P.C.Board.
2. Unscrew the 2 screws (A) and remove the MIC Base Unit as shown in Figure 1-26.

(Installation)

1. Install the new MIC Base Unit according to the opposite procedures to removing.
2. Confirm that the M cassette touches to MIC Base Unit properly.

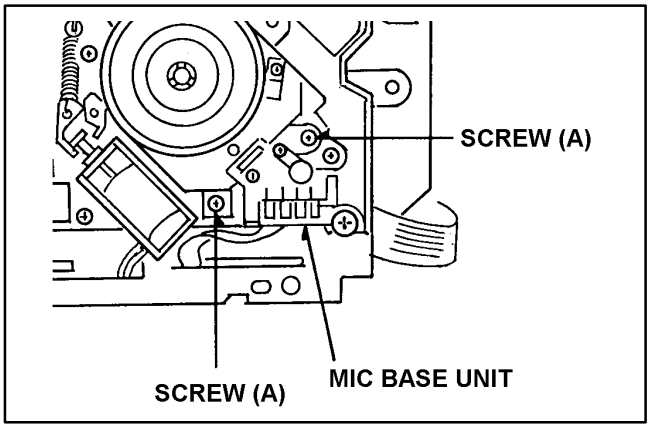


Figure 1-26

1-27. Reel Drive Motor Unit Replacement (except Camera Recorder)

<CHART B>

Model Type	TYPE A	TYPE B
Connector (A)	P16	P2016
P.C.Board (B)	MECH I/F	SERVO

(Removal)

1. Disconnect the **connector (A)** on the **P.C.Board (B)**.
2. Unscrew the 2 screws (A) and remove the Reel Drive Sensor P.C.Board as shown in Figure 1-27.
3. Unscrew the 2 screws (B) and remove the Reel Drive Motor Unit as shown in Figure 1-27.

(Installation)

1. Install the new Reel Drive Motor Unit follow the removal step in reverse order.

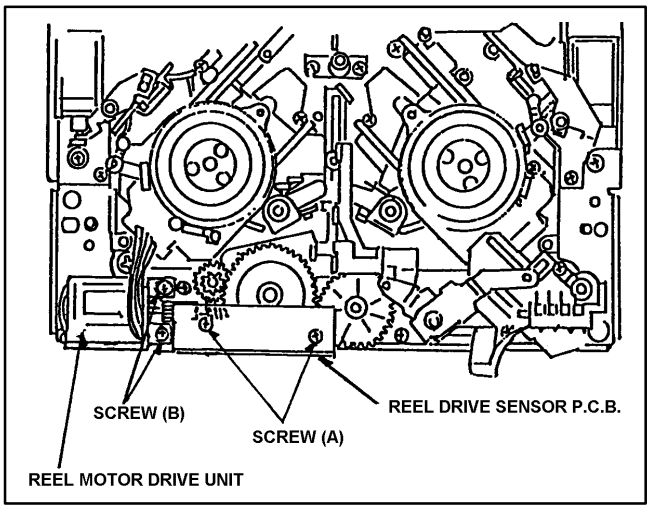


Figure 1-27

1-28. L-M Release Angle Unit Replacement (except Camera Recorder)

(Removal)

1. Unscrew the 2 screws (A) and remove the L-M Release Angle Unit as shown in Figure 1-28.

(Installation)

1. Install the new L-M Release Angle Unit follow the removal steps reverse order.

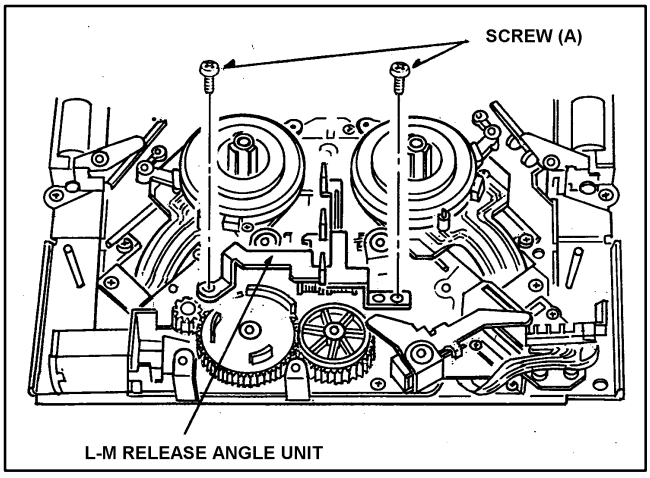


Figure 1-28

1-29. Slide Rod Unit Replacement & Adjustment (except Camera Recorder)

(Removal)

1. Remove the L-M Release Angle Unit. (Refer to item 1-28)
2. Remove the Reel Drive Sensor P.C.Board. (Refer to item 1-27).
3. Remove the Cut Washer (A) and remove the Reel Drive Cam Gear as shown in Figure 1-29-1.
4. Remove the Cut Washer (B) and remove the MIC Drive Arm Unit as shown in Figure 1-29-1.
5. Remove the Cut Washer (C) and remove the MIC Geneva Gear as shown in Figure 1-29-1.
6. Remove the Cut Washer (D) and remove the Reel Drive Arm Unit as shown in Figure 1-29-2.
7. Remove the Supply and Take Up Reel Rotor Unit. (Refer to item 1-5)
8. Remove the 2 Cut Washers (E) and remove the Supply and Take Up Base Drive Arm Unit.
9. Remove the 2 Cut Washers (F) and remove the Slide Rod Unit.

(Installation)

1. Install the new Slide Rod Unit follow the removal steps in reverse order.
2. When install the Reel Drive Cam Gear and MIC Geneva Gear, then phase adjustment should be performed as follows.

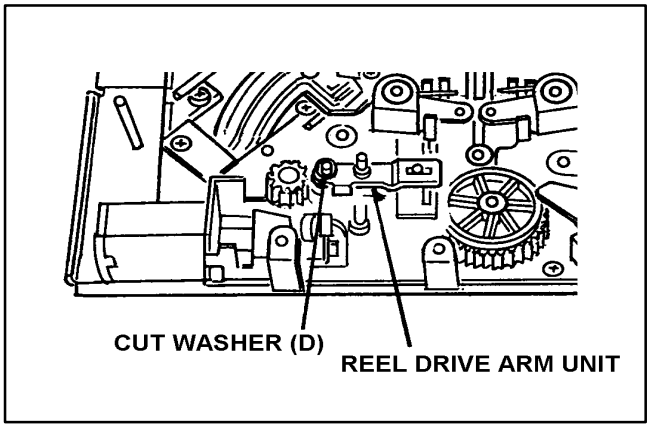


Figure 1-29-2

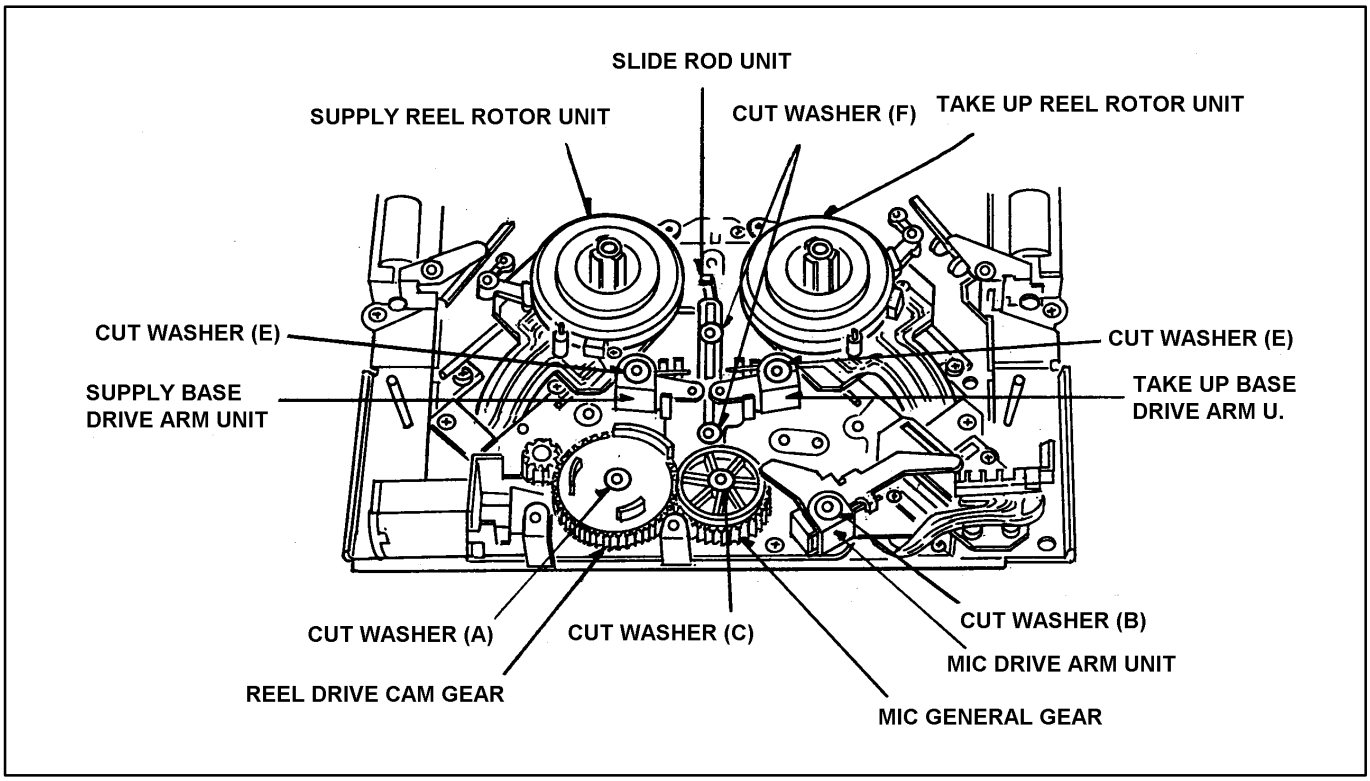


Figure 1-29-1

(Adjustment)

1. Install the MIC Geneva Gear to the Chassis.
2. Place the Reels in the M-Size position by hand.
3. Install the MIC Drive Arm Unit.
4. Place the REC Inhibit SW in front position on Distinction SW Unit by rotation of MIC Geneva Gear, and then MIC Geneva Gear should be positioned as shown in Figure 1-29-3.

Note:

Protrusion of MIC DRIVE Arm Unit is positioned as shown in Figure 1-29-3.

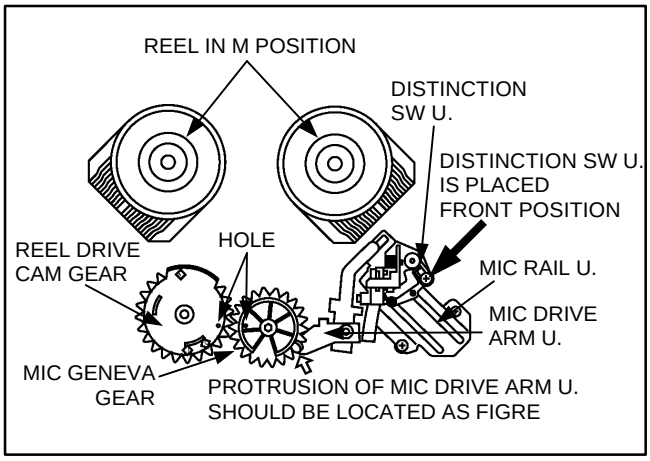


Figure 1-29-3

5. Install the Reel Drive Cam Gear and hole of Reel Drive Cam Gear should be matched with the hole of MIC Geneva Gear as shown in Figure 1-29-3.
6. Install the Cut Washer (A), (B) and (C) as shown in Figure 1-29-1.

Point of Adjustment:

1) Reel in M-Size position.
2) Set the REC Inhibit SW in front position of Distinction SW Unit.
3) Protrusion of MIC Drive Arm Unit is positioned as shown in Figure 1-29-3.
4) Holes between Reel Drive Cam Gear and MIC Geneva Gear are matched.

1-30. M-Stopper Solenoid Replacement & Adjustment (except Camera Recorder)

<CHART B>

Model Type	TYPE A	TYPE B
Connector (A)	P24	P2024
P.C.Board (B)	MECH I/F	SERVO

(Removal)

1. Remove the **connector (A)** on the **P.C.Board (B)**.
2. Unscrew the 4 screws (A) and (B) and remove the M-Stopper Solenoid as shown in Figure 1-30-1.

(Installation)

1. Install the new M-Stopper Solenoid follow the removal steps in reverse order.
2. After installation, position adjustment should be performed as follows.

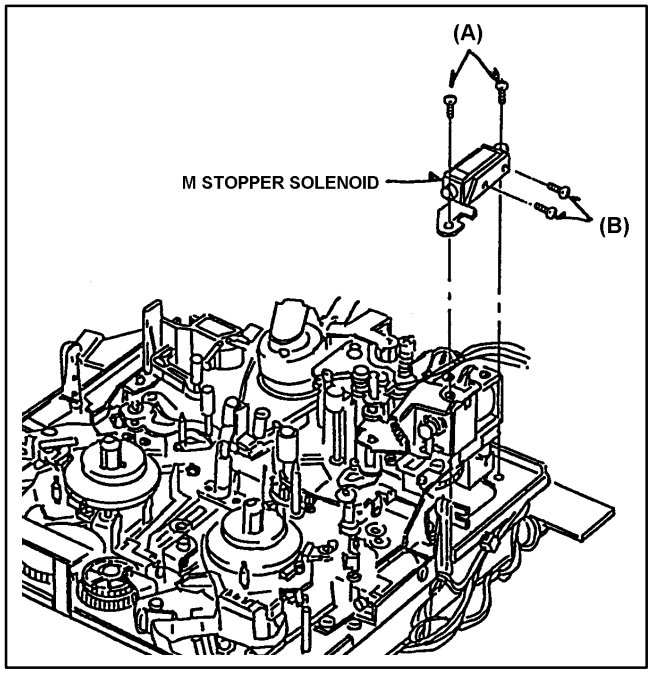


Figure 1-30-1

(Adjustment)

1. Place the reels in the L size position.
2. Push the iron core of M-Stopper Solenoid by hand.
3. Observe the clearance (A) between Mech. Chassis and M-Stopper as shown in Figure 1-31-2. And make sure that it is within 1.1 to 1.3mm.
4. If not, loosen the 2 screws (A), which fixed M-Stopper Solenoid. And adjust the position of M-Stopper Solenoid so that the clearance (A) is within specification. And tighten the 2 screws (A).

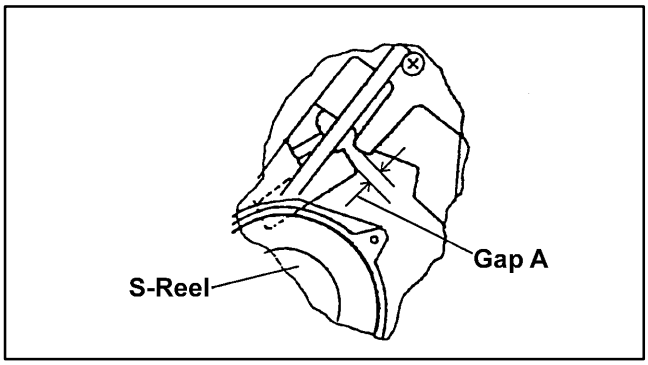


Figure 1-30-2

1-31. T4 Post Position Adjustment

1. Confirm that the hole (B) of T4 connection Gear was matched to hole of T4 post as shown in figure 1-31.
2. Confirm that the portion (C) of T4 connection Gear and hole (A) , which are located as shown in figure 1-31.
3. If not, adjust the phase of T4 post follow the above procedure.

Note:

This confirmation should be performed on unloading condition.

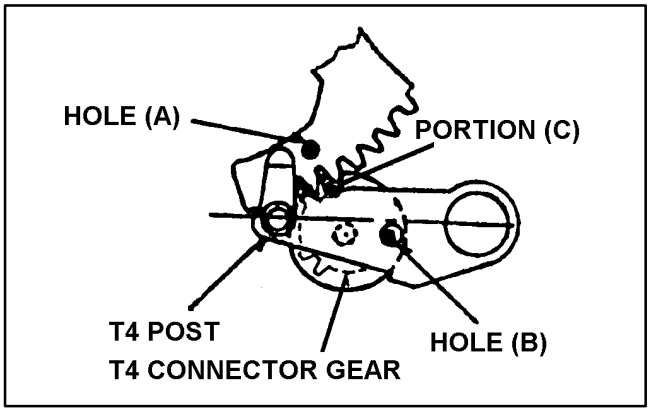
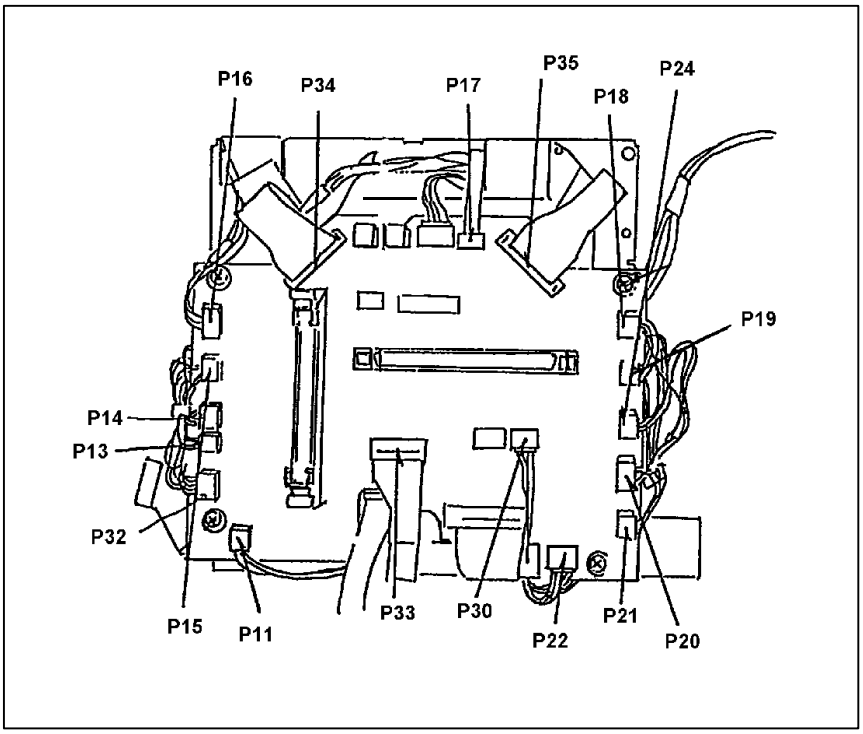


Figure 1-31

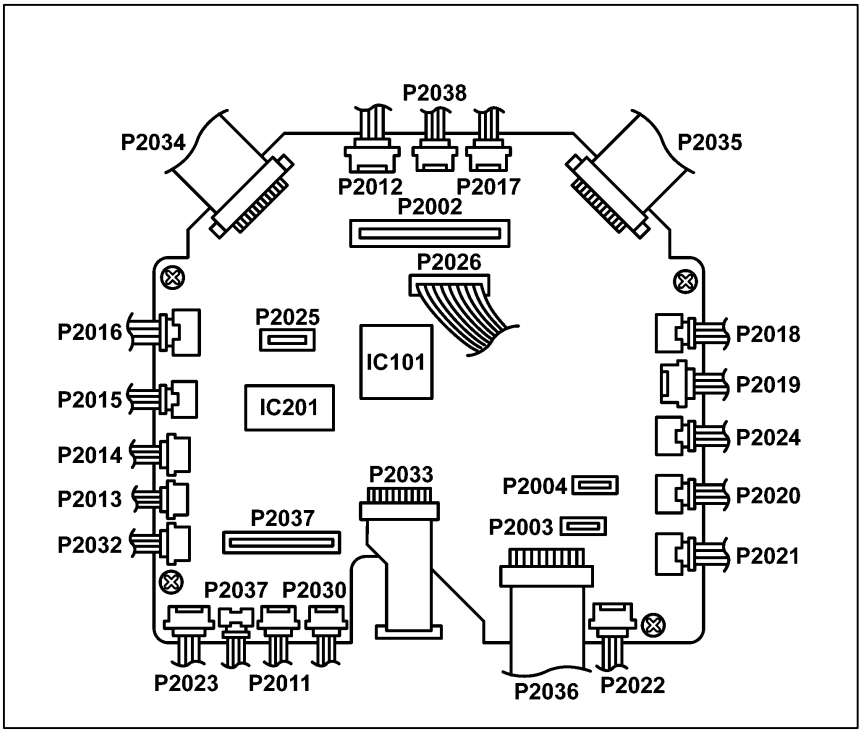
2. Connector Location

Please refer to table of <CHART A> on page 3-1, which model is apply to Type A,B,C and D.

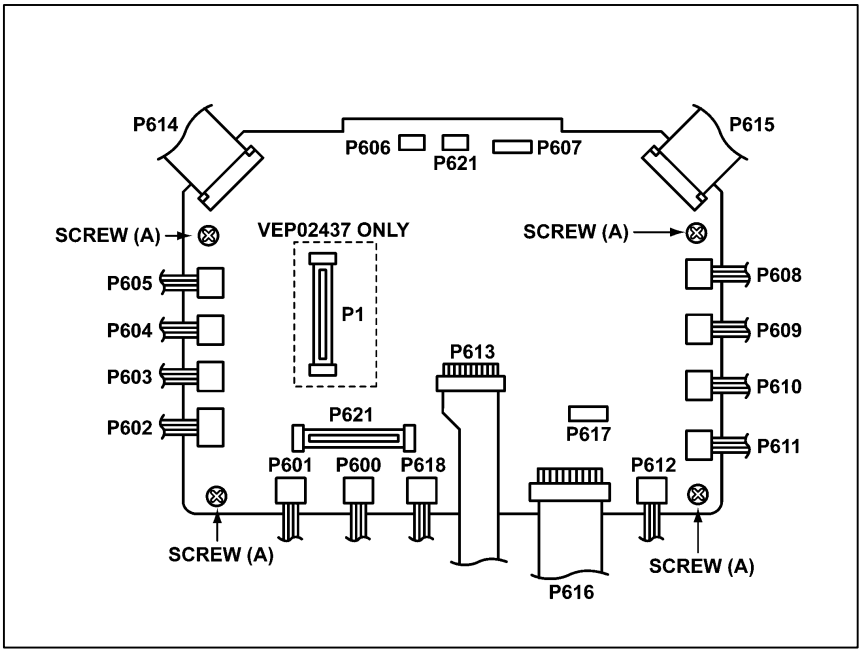
2-1. Mech. I/F P.C.Board (Type A Model)



2-2. SERVO P.C.Board (Type B Model)



2-3. SERVO P.C.Board (Type C, D Model)



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